

Radio Control

Valvoline
Racing
RC10

New Column!
Concours Corner
—Detailing
Secrets

CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

March 1997

TEAM ASSOCIATED

B2SPORT
Low Cost
Worlds Winner

HOW TO
Use paint mask
Hop up your
budget radio
Choose your
first kit

100+
mph!
Inside
the World's
Fastest R/C Cars

Mud-slinging
rally car
conversions



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Radio Control CAR ACTION

VOLUME 12, NUMBER 3 • MARCH 1997

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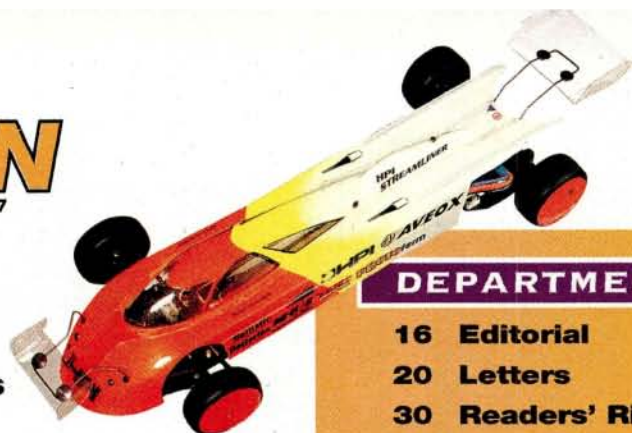
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ON THE COVER (top to bottom): Hobie Kaptan's Tamiya Ford Mondeo from the Tamiya National Championship (photo by Frank Masi). The B2 Sport rips up the cover (photo by John Howell). HPI's newest land-speed missile was caught on film by staff photographer Walter Sidas as was the HPI Rally car.

THIS PAGE (top to bottom): Kent Clausen's Streamliner Insane Car (photo by Walter Sidas); race day at the Tamiya Nationals (photo by Frank Masi); racing action at the NORRCA Truck Worlds (photo by Bill Carter).

EDITORIAL

More Power to You

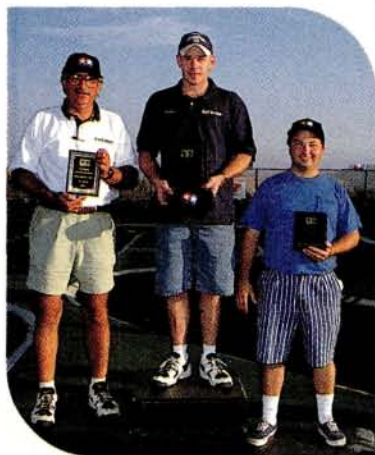
Whenever a new product that will provide even a marginal performance advantage over existing products is released, controversy and confusion ensue. This happens all the time with new tires, motors and car kits. Now it's batteries—specifically, the new Sanyo RC-2000 cell.

When news of the 2000mAh "super cell" reached the ears of consumers (and retailers), many initially felt that it was just another "new and improved" thingamabob—one to spend more money on, but one that would provide little, if any, performance gain. When racers got the cells, however, they

learned that Sanyo has in fact built a better mousetrap. With increases in both capacity and punch, the RC-2000s are significantly better (and more durable) than the Sanyo 1700SCRC cells that they replace.

Now comes the question of legality. The new cells don't make the old 1700s obsolete, but there's enough difference in performance—and cost (about \$10 more per pack)—to cause some concern among race organizers. ROAR has made the RC-2000 legal in all of its classes, while NORRCA has created a single oval class for the cells, but they aren't yet legal for any other NORRCA class.

No one seems exactly sure how the new cells will affect the hobby, but it's a fact that Sanyo no longer produces the 1700SCRC. Eventually, the supply will dry up and racers will need new packs; they'll probably upgrade to the 2000s, and tracks will have to accommodate them or lose their business. For more on these new cells, see our full report on page 60.



Shameless ego gratification. Yup! That's me on top of the podium for winning the "Media Madness" event at the Tamiya Nationals. (See page 100 for full coverage.)

LOOK GOOD WHILE YOU SPEED

While we're on the subject of high-tech stuff, our feature "Insanity Reigns" comes to mind. In it, we show you the "extreme" side of R/C car racing by highlighting five of the fastest, most exotic R/C cars in the world. But what good is going fast if your vehicle doesn't look good, too?—at least, that's what associate editor George Gonzalez always says. Check out "Concours Corner"—our newest column. It's dedicated to all you speed demons who like to look good while raisin' dust.

Did you know that Team Associated recently released a sport version of the world champion RC10B2? Well they did, and the B2 Sport is really hot. Go racing with John Howell as he takes the it through its paces in a "Thrash Test"—and mops the floor with George in the process!

And that's not all. We've packed this issue with other product appraisals and fast-paced race reports—and, of course the columns that you expect. So relax, turn the pages, and prepare to get an eyeful of R/C exploits.

Frank Masi, Executive Editor

Radio Control CAR ACTION

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Editor JOHN HOWELL
Associate Editor GEORGE M. GONZALEZ
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**Contest Correction**

In our December '96 "Letters," we inadvertently published an incorrect answer in the "Project F1" contest results. For question four: "Where was the last U.S. Grand Prix held and when?" the correct answer is Phoenix, AZ, 1991—not 1989, as we printed. Our apologies for any confusion this may have caused.

Manly Oval Trucks

I am the founder and secretary of the Manly R/C Club in Manly, IA. We have our track listed in your free "Track Directory" and are grateful for this. We run classes in stock car, pan car, truck and a spec class called NASTruck. The problem we have run into is deciding the correct weight for on-road oval trucks. This is a carpet oval, not off-road, and as ROAR or NORRCA do not, according to everyone else, run this class—or at least they don't list it in the older rule books—we're having trouble determining the correct weight for our track rules. Many local tracks do not have weight rules, and others do only when they're sponsoring a ROAR or NORRCA event. Our rules chairman and most of the club members think that it should be the same as the stock-car gearbox class at 52 ounces. If you can help settle this in any way please, let me know.
BRUCE A. HILL
Manly, IA

Typically, race-sanctioning bodies don't run a class for gearbox cars and trucks for their carpet- or paved-oval races. If you're using wide-suspension off-road trucks for carpet oval, you should probably specify an off-road minimum weight because these trucks have larger wheels and tires and do weigh more than their buggy counterparts. If you are

simply attaching super-truck-type bodies to your existing "gearbox class" buggies, you should follow your 52-ounce minimum weight rule. **FM**

Keep it Cool

In the November '96 issue, you reviewed the Kyosho Super Ten GP R/C car. You had an O.S. .12CV engine mounted in it. In the article, you mention how the engine's cylinder head can be positioned for either sidewinder or fore-and-aft mounting. In the picture, you show the engine mounted in the fore-and-aft manner, but the



cylinder head is in the sidewinder configuration. The cylinder head on the O.S. .12CV engine has the unique "heat vent" design. The air flows into the fins, downward, across the top, upward and then out through the opposite side, i.e., the fins should be perpendicular to the airflow. The pictures show the fins parallel to the airflow. In practice, you probably won't have problems if the airflow is sufficient and the engine is not run too lean, or with a very high-nitro fuel. It just isn't set up in the optimum manner (according to O.S.). This note was brought on by the concern of some of our product support people that some novices might use the article as a guide to setting up their cars and that they'd mount the engine incorrectly.

BILL BAXTER
Hobby Services Manager
Great Planes Model Distributors

Oops! You're right, Bill. However, as you've noted, if you allow plenty of cooling air to reach the cylinder

head during operation, the orientation of the fins is less crucial. In that particular Kyosho car, the cylinder-head temperature never rose above 210 degrees when running 20-percent-nitro fuel. **FM**

TA03F-Pro "Mid"?

I bought the Tamiya TA03F-Pro that I'd been saving up for. I picked up an Elite BMW M3 body because it was reasonably priced, looks cool and seems to be one of the best handling bodies around. I also equipped the car with a Novak Tempest ESC, a Peak Performance Rick's Pick modified motor and a complete set of HPI V-Groove Super Radials.

I really love how the car performs, but I heard that the TA03F-Pro could be converted into a more conventional mid-motor layout that gives the car more steering. Is this true? If it is, I sure would appreciate knowing which extra parts (if any) I will need for the conversion, and I'd also like a brief description of how it's done.
BOB MAHONEY
La Verne, CA

You must have read our minds, Bob. Frank, Doog and I had been discussing this subject when I came across your letter. One of our contributing authors converted his TA03 into a mid-motor drive train and has not stopped raving about it. He claims that after the conversion, the car has a lot more steering and his lap times have dropped considerably.

I'm told that only a little modifying and very few parts are needed for the conversion. It's basically just a matter of swapping the front and rear gearboxes. Well, there's actually a little more to it than that, but that's the basic idea in a nutshell. We plan to publish a "How To" article on converting the TA03F-Pro into a mid-motor-drive chassis, so stay tuned. **George**

Double-X4 Tourer?

I read your article on the new Team Losi Double-X4 in the January issue. I can't wait for this car to be released. I thought I'd put in my two cents on George's "second opinion": I presently race in both modified buggy and modified truck classes at my local track. I don't think I'll give up one of these classes to run the Double-X4 in the 4WD off-road class. It's not unheard of to run in three different classes at a single racing event; I've done it many times.

My question is: does Team Losi plan to release a touring car version of this chassis?

MARK SHERIFF
Monterey Park, CA

Mark, I'm glad that you liked the article on the Team Losi XX4. Wow! You race in three classes in one day, huh? I have a hard time keeping up with the pace whenever I race in more than one. If more people would show up to race at our local track, there would be more heats, and I would have more free time on my hands. Unfortunately, only about 35 people show up on typical Sunday morning, and that means a very fast pace. I don't have enough time to dial in my cars properly, and as a result, my performance leaves a lot to be desired.

A Team Losi touring car, huh? I have to admit that has a nice ring to it. The folks at Team Losi will not confirm the rumors that they will soon make a touring car based on the XX4. It is kind of odd, however, that a predominantly off-road company like Team Losi would even think of releasing a touring car. I'll tell you what, though: if Team Losi does indeed produce a tourer, I'll be the first kid on my block to own one. **George**

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

INTERNET ADDRESSES:

Frank Masi: frankm@airage.com
John Howell: johnh@airage.com
Chris Chianelli: chris@airage.com
George Gonzalez: georgeg@airage.com

In search of fun
and glory, 'cause
life's too short
to be a sheep • by Chris Chianelli

INSIDE scoop



PRESTO! Easy Access

According to Great Planes, the U.S. distributor of KO Propo, the new Presto EX-11 is not only the easiest computer radio to use, but it's also the most affordable. What makes the programming so easy to use, I'm told, is that the computer novice can go in and access only basic functions and change them without having to cycle through the entire program, which contains many functions found on top-line radios. Yes, we'll have the full report as soon as possible.

Rally a Bargain

Kyosho now offers these Peugeot (below) and Renault rally racers based on a front-engine, front-wheel drive variant of its affordable

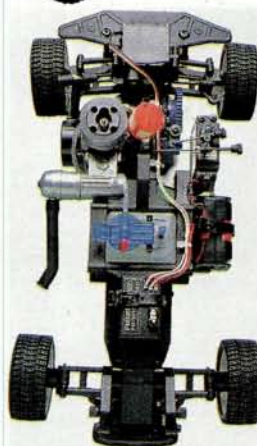


nitro powered, but hopefully, an electric version will also be available.



Also shown is the new Lotus Europa (above) for Kyosho's Nostalgic Series chassis. The decision to import the Europa, an exotic that's somewhat less known in America, has not been made as of this writing.

Mantis chassis. The kits are available right now as



For those of you on a strict budget and those who want to give drag racing a try, Bolink's new Econo-Rail may be just what you're looking for. Put simply, here's some of what you get for \$99.95: graphite sub-frame; aluminum front wheels, axle mounts and motor plate; a fiberglass chassis; stainless-steel rear axle; 1/4-inch-diameter aluminum-beam front axle; and a 24-inch-long rail body. If you're one of the reluctant, looks as though your wait is over.

Also new from the Bolink boys (and girls!) is this '34 Ford Sedan for the Legends Series car. I love boxy-fendered sedans. Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0252; fax (770) 963-7334; email: brule@bolink.com.

NO DRAG ON THE WALLET



NEWS BRIEFS

Trinity driver Joel Johnson proved yet again he's the reigning "carpet king" by winning yet another modified class at the most recent Cleveland U.S. Indoor 4-cell Championships (the most prestigious 1/12-scale race in the U.S.). Joel's seventh Cleveland title gives him more than twice as many as the next closest winner.

Joel took the lead and waved goodbye to the rest of the field as he put together a 9-second gap, leaving the rest of the pack to battle it out for second. It was just like the old days, when Joel earned the title of the "Magic Man."

The "Magic" is Back!



To win, Joel used Trinity VIS EX-TRA matched Sanyo 1700SCRC cells (the new RC-2000 cells were not then legal), a Dirtinator-powered Revolver 22.2j and a ProtoForm Nissan body. The 15-turn-double modified Dirtinator was set up with Trinity Silver brushes and light springs. Joel's car was also equipped with a Tekin G12cIII Supersonic speed control. Joel feels the Tekin gives him more low-end power and seems to be much

easier on the batteries, which allows a hotter motor to be run.

The Magic Man is more determined than ever to regain his title as the best race driver in the world. I'm with you, gentleman Joel. Good luck!



HATE TO PAINT?!

Don't even try to deny it; I know you "hate-to-paint" guys are out there. Even if you won't admit it, that "artistic" splatter-job Mercedes body you show up at the track with gives you away, that's right; the one you tell everybody, "I-I-I was experimenting with some new air-brush techniques. Yeah, that's it." Look, I'm not saying you can't do a righteous paint job, you just hate to paint. We'll leave it at that, OK? Factory Works now offers this Volvo 850 Wagon (very funky; definitely one of my favorites) in the famous Omega blue and white scheme you see here. All you do is trim the body and add the included decals (two sheets) and you're looking serious.

I gave one to editor John Howell and he said, "What do I need this for, man?" (You see, he's one of these guys who can't paint and doesn't know it!) So I told him it would make his car go faster, to which he replied, "Thanks man, I really appreciate this." Suggested retail is \$57.95. Contact Factory Works, 505 Smith Ave. #105, Corona, CA 91718; (909) 735-5516; fax (909) 735-5642.

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Our 128
Tooth Spur
Is Lighter Than
Most 100 Tooth
Spur Gears!

Pro-Line R&D A 2-Way Street

Some of you may already be aware that Pro-Line's FiST-CEP program (Full-Scale Tread and Compound Evaluation) has worked out very well for them. For those who are unfamiliar with the program, here's a brief update. Pro-Line engineer and designer Tim Clark has at least four sets of each newly proposed tire design produced in full-scale size before the design goes into full production. These test samples are then mounted on the Pro-Line NASTruck Chevy Spec-Truck exactly as they would be on a $\frac{1}{10}$ -scale parking-lot vehicle using thick mil-spec cyanoacrylates and foam inserts—that's right, they are *not* inflated. At first, the industry didn't see the value of actually driving the tires, but those in the know have seen the results. Driving the prototypes on the tight racing suspension of the lightweight



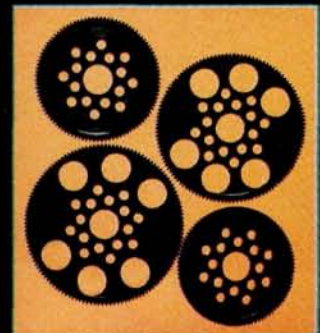
Spec-Truck has allowed Tim to fine-tune tread design and examine differing carcass and sidewall structures like never before. The strangest surprise? It seems that Tim's application of $\frac{1}{10}$ -scale practices turns out to be, in certain cases, actually beneficial in the full-scale scenario. Tim's tread-

design evaluation and testing have carried over so well to full scale, it's rumored that Firestone, Goodyear and Pirelli are more than just casually interested in his findings. One obstacle, however, is the problem of the un-sprung weight caused by full-scale foam inserts.

FRICTION

SUPER GEARS™

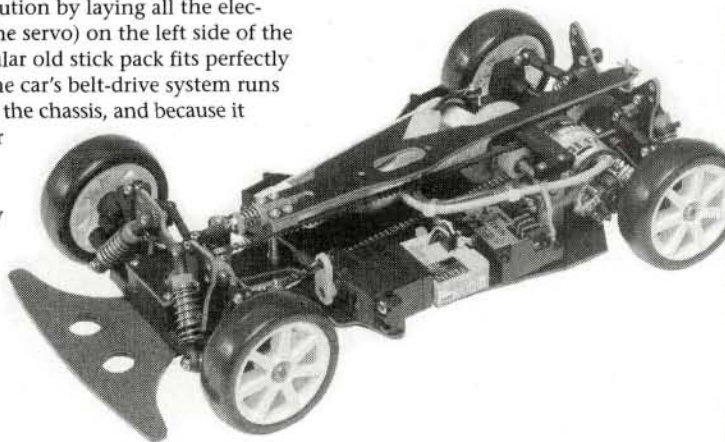
- New Super Low Drag Narrow Tooth Design •
- Graphite Filled For High Tooth Strength •
- Super True, Super Light, Super Quiet •
- 84 & 87 Tooth Sizes For Losi XX-CR & XXT-CR •
- 95, 100, 120, & 128 Tooth For On-road Racing •
- Dual Diff Ball Holes For Stealth & Corally Diffs •



Yokomo's Latest "Lot Monster"

The latest "lot machine" from Yokomo is this YR-4 II. I can't tell you much right now, but Yokomo managed to improve the car's weight distribution by laying all the electronics (including the servo) on the left side of the chassis, while a regular old stick pack fits perfectly on the right side. The car's belt-drive system runs down the middle of the chassis, and because it doesn't have to clear any objects such as batteries or servos, the belt is extremely efficient.

Also new from the "Yok" factory are the Porsche Boxster, Mercedes SLK and BMW Z3 bodies.



T-Tech's Off and On Updates

Tenth Technology has improved its world-class, competition-proven Predator International 4WD off-road buggy (below) and renamed it the XK5. Internal improvements are large-volume, hard-alloy, Teflon™-impregnated "ProtoShocks" (as used by the Factory Team in the latter part of '96); Tenth Tech's patented, efficient "BUD" drives, which transmit power to all four wheels smoothly and simply; massive new wishbones with 4mm studs; and beefed-up heavy-duty ball joints, which make the new car much more rugged. Externally, the XK5 features a new low CG,



and internal-flow body (with a wing made from material crash-tested at freezing temperature), which gives the car that function-follows-form, serious-contender look.

Also new is the Predator DTMi 4WD touring car which, according to the manufacturer, has won every round of the six-round British Championship series. The DTMi features a one-piece composite chassis; efficient, low-maintenance, sealed-gear tranny; hard-alloy, Teflon™-coated shocks; computer-optimized inboard racing suspension; and silky-smooth "BUD" drive system. For more information on both the XK5 and DTMi, contact Maxtec Development, 3740 Overland Ave., Ste. B, Los Angeles, CA 90034; (310) 815-0251; fax (310) 815-0253.

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1997. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



NEAT FLEET

Keith Durbin of Arvada, CO, sent us this photo of two of the cars he has been "riding" since he started in the hobby 10 years ago. The VW bug was his first R/C car. It started life as a Tamiya Frog and Keith added a Novak ESC, Pro-Line rims and tires and a Trinity motor. The bug is still performing in the Retro class at his local club. His other ride is an original RC10 with a gold-anodized aluminum tub chassis. He tells us it's still racing—even up against newer B2s and Double-Xs—and the only changes he made were to replace the tranny with a Stealth tranny and install longer front A-arms and new wheels and tires. It also runs with a Trinity motor and Novak ESC. Both are controlled by Airtronics radios.

HAZARDOUS HOMEBUILT

John Hanson of Novato, CA, scratch-built the chassis and motor plate on his Kyosho Ultima from polycarbonate in his neighbor's garage. He equipped it with a Futaba ESC, Deans plugs and Bridgestone knobby tires, and he controls it with a Futaba Attack III radio. John topped off his ride with a custom-painted "Dukes of Hazzard" body. Boss Hogg would be proud!



HOPPED-UP RACER

Johan Berström of Borlänge, Sweden, sent us this photo of his Losi Double-X buggy. He races this hopped-up machine both indoors (in the winter) and outdoors (come summer) in central Sweden. To make his buggy perform, Johan equipped it with LRP ICS digital ESC, Maxtec 12x2 modified motor, Futaba 9402 steering servo, Losi X-celerator body, Losi aluminum motor plate, Losi aluminum top gear, RPM long rod ends, Losi 2.5-degree rear hubs, Losi adjustable steering servo mount set, MIP blue O-rings, MIP diff-rebuild kit and MIP CVD drive shafts. He controls it with a Futaba FP-T2PBK transmitter.



KILLER INSTINCTS

Between its Kyosho Spider GP-10 chassis and its Dahm's Piranha body, this ride is one nasty beast. Don Reynolds, of Albuquerque, NM, sent us this picture of his competition killer, which is equipped with a bunch of Kyosho options including swaybars, bearings, a 2-speed tranny, ball diffs, a receiver cover, a high-torque steering servo and belt tensioners. All he's waiting for now are an HPI .15 engine and a new body from Dahm's. In the meantime, it's consuming stock GP-10s at the track.



KITTY CAT

Jana Holmberg of Clackamas, OR, constructed this Tiger Legends sedan from tail to whiskers. It runs with a Trinity Midnight motor, a Novak Explorer speed control and NER-3FM receiver, Deans Ultra Plugs and an Airtronics 3Ps radio. A real eye-catcher, this car is raced regularly at the Kit Car Raceway in Portland. Hope it keeps purring for a long time to come, Jana!



SOUTH AFRICAN STAR

Concours winner at the last South African Nats, this HPI RS4 MacLaren F1 GTR is owned by Shiraz Dada of Denkit Hobbies, Durban, South Africa. Shiraz equipped his winner with a Futaba S9302 servo, Tekin G12C ESC, Trinity 13-turn quad motor, Trinity 1700 SCRC batteries, Kose super steering kit, Tamiya aluminum shocks, HPI rear stabilizer and HPI one-way pulley. He controls it with a Futaba 2VR radio. Judging from its winning results and stellar appearance, it's built for speed and beauty.

TRAVELING TRAXXAS

Doug Cole of Hattiesburg, MS, tells us his Traxxas Stampede will go anywhere, and we don't doubt it! He uses a Novak M1c speed control, an Airtronics CS2P radio and servo and ball bearings in the tranny. The truck runs with its stock, 20-turn motor, which Doug says provides plenty of power. Pack your bags, your Traxxas will take you traveling!



JOINT EFFORT

These two Formula 1 cars were built by Mike Devlin and Don Sweder. They race them on a huge parking lot where they work in Carlstadt, NJ. Both run on Trinity Onyx motors and Novak electrics and were handpainted by Mike. They recently joined the parking-lot craze with their Tamiya sedans with various modified motors and battery combinations. It seems Don, Mike and their cars are inseparable. Our question is: will they be willing to share their complimentary *Car Action* subscription?

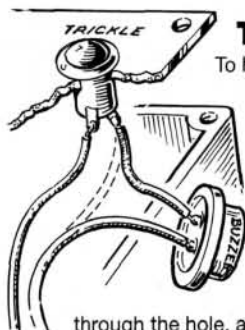


NOVAK
ELECTRONICS, INC. RACING TEAM



PIT TIPS

by Jim Newman

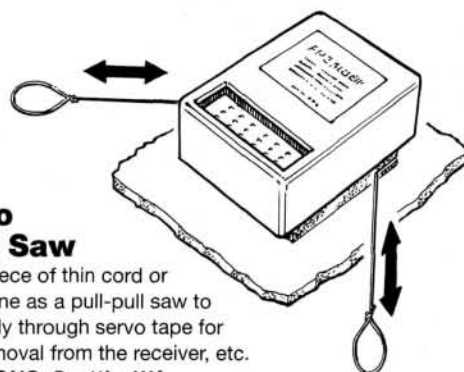


Trickle Buzzer

To hear and see when your charger switches to trickle mode, cut one of the leads going to the trickle-charge indicator light, and solder in a Radio Shack buzzer.

Bring the wires out through the hole, and place the buzzer on the side or top.

JOHN DANN, Cleves, OH



Servo Tape Saw

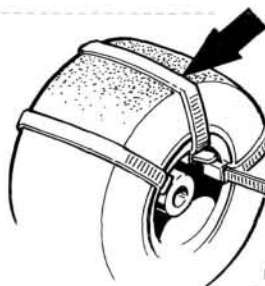
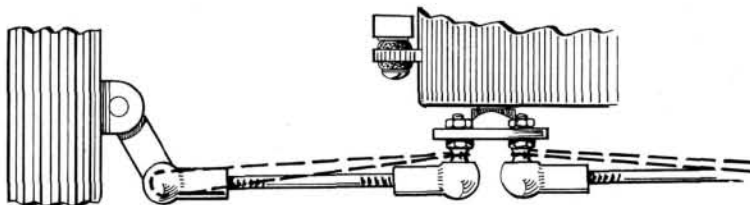
Use a piece of thin cord or fishing line as a pull-pull saw to cut neatly through servo tape for easy removal from the receiver, etc.

NHI LUONG, Seattle, WA

A-Tension!

To take up any play in your steering caused by worn parts, hook an orthodontic rubber band around each ball joint.

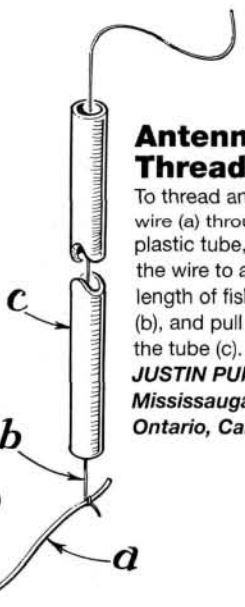
**BRUCE TRIPLETT
Martinez, GA**



Tie-Wrap Traction

When your tires start to wear, space a few small Radio Shack cable tie wraps evenly around the wheels for restored traction and tire balance.

**RUSSELL LIPHAM
Marietta, GA**



Antenna Threader

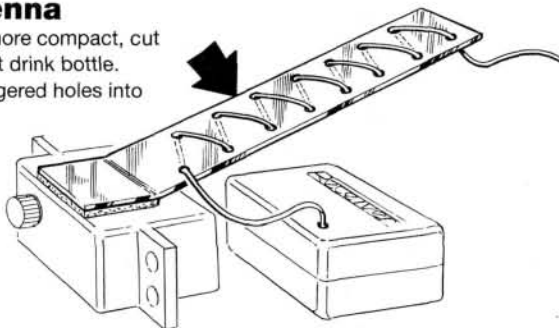
To thread antenna wire (a) through its plastic tube, attach the wire to a short length of fishing line (b), and pull it through the tube (c).

**JUSTIN PURDY
Mississauga,
Ontario, Canada**

Compact Antenna

To make your antenna more compact, cut a strip from a plastic soft drink bottle. Bend the strip, drill staggered holes into it, and lace the antenna through the holes. Tape the strip to the servo so that when the body is fitted over it, the strip will conform to the body. Do not coil the antenna; it shortens its range.

SAM KIM, San Bernardino, CA



Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



TROUBLE SHOOTING

by Doug Mertes

Mischievous "M"

After I read the article on the Tamiya M-chassis cars (September '96), I went out and bought one. I started racing buggies, but now you've got me hooked on this little red rocket! I'm finding it difficult to set it up so that it will run straight without my tinkering with the trim. I'm also not comfortable with the front-wheel drive. A little toe-in seems to help, but when I give the car the gas, it still pulls to the right and then straightens out until I hit a bump. I plan to race indoors, and I want to improve the car's handling. What advice do you have for

an M-chassis driver with regard to parts, racing setups and maintenance? Do you think that the Manta ball differential, front and rear stabilizer bars, M-change bones (universals), or super steering set are worth the money? How about the Acto-Power motor?

NO NAME GIVEN
via email

I'm with you, guy! Once you've managed to get a mini to work properly, it's hard to go back to anything else, isn't it? And it's amazing how many of the mini and Alpine coupes are painted bright red!

Forget the toe-in; go back to no toe at all up front. The steering has a lot of slop built into it, even when using the metal replacement-parts kit that's available from Tamiya. The Kose setup does tighten up the linkage, but I'm not sure that the loose steering is such a bad idea. Short-wheelbase cars on a narrow track can get pretty twitchy, so maybe the steering slop lets the front wheels find their own center; the car might be a real handful with linkage that's too precise. Set it up so that the car runs pretty straight when

you are coasting, and then expect to correct it when necessary, especially down a long straightaway. You can't go to sleep while driving a mini!

The gear diff will always make the car pull to one side when you whack the throttle; install the ball diff and use a sealed 5X11mm ball bearing inside instead of the thrust bearing. Tighten it down so that it doesn't slip; you'll still have excellent differential action. The car will pull to one side on occasion, but much less than before.

When running indoors on carpet, switch to foam tires. Grind or file the ridges off a set of rims and mount F1 or 1/12-scale rubber on them. A tip: buy a pair of rears and cut them in half; you can do two wheels with each rear donut.

The stabilizer bars work really well outdoors—they helped me out-qualify the field by a full lap earlier this year—but my racing buddies tell me that they leave them off when they run on smooth carpet. You can use the stock shocks or swap them for oil-filled touring-car units; both seem to work about the same. If you have to use rub-

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, Radio Control Car Action, 100 East Ridge, Ridgely, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

ber tires, run slicks with dense foam liners.

Universals seem to be a good idea, as they are somewhat more efficient than the dogbone/stub axle combo. Make sure you clean and grease them regularly. Check the kingpins after every run; they tend to loosen up after a battery pack or two. The Acto-Power motor is pretty cool. Not only is it more powerful than the kit motor, but it's also shorter, thereby centering the weight in the chassis. If your club or racing organization allows it, give one a try!

Finally, a lot of M-chassis drivers think that bodies make a whole lot of difference, so check out the available Lexan that fits from Kose, Elite, Tamiya and HPI. You're sure to find something there that will fit your driving technique. Good luck with your mini!



Shocking Street GT

I would like some more info on the RC10GT featured in the October '96 R/C Car Action. I run my GT on a parking lot every Sunday, and my front shocks keep popping off. I've lowered the truck's chassis, changed the rear hub carriers to 3 degrees and reversed them, installed 15-degree caster blocks up front with red springs on the front and blue and gold ones in the back (I put them on together and it works great!). I just need to keep my shocks and tie rods on while I'm racing. Help!
RODNEY FRY
via email

Wow, an RC10GT that's lowered for the parking lot. That sounds like fun! The fact that you can reverse the hub carriers, thereby eliminating most—if not all—of the rear toe-in, means that you have plenty of traction on your lot. That's great, but it also means that the shock ends have to deal with mondo stress and strain from all of

the G-forces that result from the truck's cornering ability. You didn't say how you've lowered your chassis, so I'll assume that you've used some combination of raising the upper mount and limiting the shock travel with some spacers or rubber tubing under the piston. With the shocks laid down like this, you're compounding the stress caused by the cornering, because the wheel has more leverage on the shock mounts. You also mentioned that the tie rods pop off; this is typical of setups that have a great height differential between the steering spindle and the steering rack. I

would guess that your spindles sit higher than the steering linkage that's on the chassis, don't they?

To keep your shocks in place, I'd start by purchasing new Associated lower shock mounts. Install them with a no. 4 washer covering the small end of the metal ball on the mount. If you set it up this way, there's no way the lower end of the shock can come off without ripping the bolt out of the A-arm. Make sure you're using a 4-40 bolt of the proper length, because under impact, a short one will come out of the arm very easily. You may have to replace the front arms if the screw hole has been enlarged by your problem.





TROUBLE SHOOTING

Motor Meltdown

My friends and I are just starting to experiment with highly modified motors in our Kyosho TF-2 sedans. We've put Trinity silver brushes in our motors (a Dirtinator 11-quad, a Trinity Team Edition 11-triple and a Reedy Ultra Sonic 12-quad), and after a day of racing, two of our motors exhibited uneven brush wear: one brush was half the length of the other! What causes this, and is there any degradation in motor performance? The three of us are using Tekin G12 ESCs, 1700 SCRC batteries and gear ratios of 4.5:1 to 5:1. While I have your attention, many *R/C Car Action* articles about sedans suggest using mild modified motors (around 15 turns), but everyone at the track uses the fastest motor possible. How come?

GENE YEH
Fremont, CA

Ah, the glorious TF-2! So lithe, so sprightly, and so wonderfully and wickedly fast when pumped up with some juicy SCRCs and a low-turn motor! Gene, you

and your friends travel in the same bizarre R/C universe as I do, and I think I can answer your questions. Have you tried the commutators on your modified motors? You are experiencing fairly rapid brush wear, even for such stout winds. (Although you don't say how long your "day of racing" is, let's assume that it's 10 battery packs or less, including practice.) Unless you're running in extremely sandy or gritty conditions (possible, given that you're from Fremont), I would guess that your comms are chopping away at the brushes through the slots between the comm's contact faces. Next time you true the comm (which should be every six to 10 runs on that kind of motor), run an X-Acto blade backwards through the slot to clear out any copper chips or debris; then run a ball-point pen up and down the gap a time or two to burnish the edges of the slot. This will prevent the slot edges from becoming too sharp. You should also



chamfer the brush faces, especially on the leading edge. If you're used to stock or mild mod motors, you'll be amazed at the brushes that these ultra-fast modifieds will eat, but these techniques should reduce your problem as much as possible. Because of current load, one brush—usually the negative side—will wear more quickly than the other, but if your brush springs are the same tensions, you should be able to avoid wearing one out twice as fast as the other.

To first-time users, I rec-

ommend mild mods (like the 15-turn ones you mention) for several reasons: you don't have to buy new batteries to make run time; they are even faster than hot stock motors; machine-wound motors are less expensive than full-blown modifieds; and they require less maintenance, as you have discovered. As you mentioned, more experienced sedan racers who are already equipped with decent Sanyo 1700 SCRCs typically use 11- and 12-turn hand-wound mods.

Do the "Servo Slam"

Last summer, I bought a Team Losi Double-X with a Futaba S-148 servo, a Trinity Topaz 11-turn modified



motor and a Sanyo 1400 SCR matched battery pack. The day after I built it, I had an accident and cartwheeled the car. Afterward, it glitched when I tried to turn to the right, but it was OK when turning left. Now, its wheels barely turn either way, even when the front is propped up. What gives?

CHARLES SIROTA
via email

Charles, the Futaba S-148 servo is a marvelous piece of radio-control technology, with decent torque and speed at a bargain-basement price.

Unfortunately, it wasn't designed to do the "amazing Sirota barrel roll

with a twist" and come up smiling! My friend, either you completely stripped out your servo horn and it's not "grabbing" the servo output shaft, or you've killed the poor thing.

If you're especially handy with teeny little gears and such, remove the four long screws from the bottom of the servo case to inspect the gear train. Carefully pull off the top cover, and check whether any of the upper gears are missing teeth. If they are, replacement gears are inexpensive, and you can get them from almost any hobby shop. They also come with a diagram showing how to put them in the right place. If the gears look OK, you've probably wounded the servo motor's potentiometer (one of the gizmos that

tells the servo motor how far and how fast to move from side to side). This is too difficult and expensive to replace in a servo in this price range. If that's the case, just replace the servo.

You might also want to upgrade to a servo with faster response and more torque, such as Futaba's 9304, which has a case of about the same size. It will hold a line better, especially when you're dealing with soft, fluffy, or blue-groove conditions. You might also want to check the tension on the servo-saver that's built into the steering assembly to make sure it's not too tight. And try to keep the shiny side up!



Dressing Up Your Chassis

HERE IT IS folks!—"Concours Corner"! At last, here's a column that's targeted toward all you R/C'ers who have a knack for detail, a passion for aesthetics and a love of motor sports. An old R/C saying sums up our goal for this column quite

more attention for my awesome-looking rides than the fast guy with the big trophy does.

At most major racing events, there's a concours event in which racers compete for the "best-looking rig" honors—not for the fastest lap times. In fact, many of the concours contestants wouldn't dare put their highly detailed vehicle on a dirty track and subject it to the bashing and crashing that we call racing! With that in mind, we'll feature tips on how to paint bodies, detail interiors, apply decals, set up working lights and much, much more. The sky's the limit, folks, and

Check out these cool anodized Oh' Nuts from Factory Works*.

The gold and blue Oh' Nuts come in 8/32- and 10/32-inch sizes and will fit most Losi and Associated off-road vehicles. They're manufactured to aerospace tolerances and are lighter than the stock units. I particularly like the green, nylon, locking mechanisms inside the blue Oh' Nuts.

well: "If you can't have the fastest car at the track, at least have the best-looking one." I've always been a strong subscriber to this philosophy and consistently receive

as always, we encourage you to write or email us with article ideas, photos of your best work and anything that you feel will work well within the theme of this column.

In each column, we will publish color photographs of our readers' top accomplishments! This means that you will have an opportunity to showcase your concours winners in an

Trinity is well-known for purple-anodized hardware, and for good reason: it has the richest color I've ever seen. The company also sells fluorescent tie-wraps in a variety of colors. For your convenience, Trinity also sells complete screw kits for Losi and Associated cars and trucks.

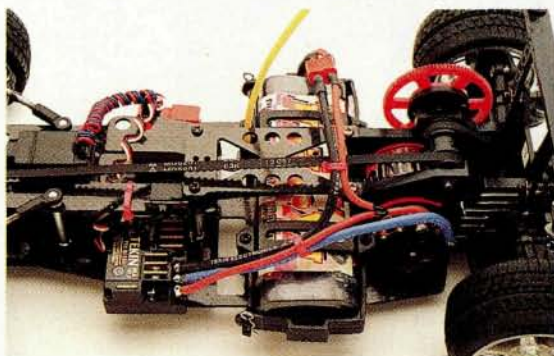


OFNA Racing sells all sorts of cool anodized hardware: 3mm and 4mm locknuts, cone washers, concave washers and ball joints. This stuff will dress up any chassis and make it look high-tech. Remember to stick with one color, or your chassis will end up looking hack.

international magazine, so the world will see just how detailed you can be.

In addition, with the advice of the industry's best R/C detailers, we'll show you how to build a concours-winner. With

more than a chassis with a wiring job that resembles an old telephone switchboard. Many concours judges also factor electrical wiring into their overall decisions, so don't be caught off-guard.



This is what I call a cool wiring job. The ESC wires were all custom fitted; colored tie-wraps are used sparingly; the servo and ESC wires are coiled; heat-shrink tubing is used on the Deans Ultra Plugs; and the positive motor/positive battery (third ESC) wire has liquid electrical tape applied. Check out the Paragon Neon Yellow antenna tube—nice finishing touch. Hey, guess what type of chassis this is?

all this said and done, let's dive right in and get started on detailing your rig.

CONCOURS CHASSIS?

I know, I know. What's a chassis have to do with creating a stunning-looking car? My answer—everything! Nothing ruins a beautiful body

1. Shorten wires. Keep your wires short: nothing makes me cringe more than the sight of a shoddy wiring job. If you want your chassis to have that neat, all-business look, you'll have to customize the length of your wires—those for the motor, battery and ESC. Tekin* and Novak* sell ESCs with



external wire posts that allow you to replace the motor and battery wires if you need to. The best way to do this is to test-fit your ESC, then cut the wires to size. Shortening the wires will also increase your car's performance because valuable

attachment points for their battery-charger leads. Forget it, man! That just doesn't look cool, so use the shrink-wrap or liquid tape. Star Brite sells some really cool liquid tape that gives professional-looking results. Just apply a couple



OK; here's my secret method of coiling ESC wires. Coil the wire around the blade of a long, thin screwdriver. As you roll the wire, keep it tightly tensioned. When it's completely wound, release the end, and the wire will stay coiled like a telephone cord.

juice will not be wasted by running through excessively long wires.

2. Use shrink-wrap or liquid electrical tape. If you install high-performance battery connectors such as Deans* Ultra Plugs, be sure to use one of these products to insulate the soldering tabs after you've soldered the wires on. Some racers choose not to do this because they use the exposed tabs as

of drops to your exposed wires, and in few minutes, the liquid dries and forms a waterproof insulation—pretty trick stuff!

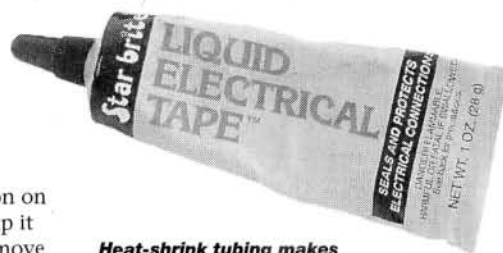
3. Coil your wires. The wires that exit your ESC and steering servo are usually too long. Coil them or zip-tie them neatly to give your chassis that professional look. To coil your wires, you'll need only a 4-40 Allen wrench or a screwdriver with a thin shaft. While

keeping some tension on the wire, simply wrap it around the tool. Remove the tool, and the wire will stay neatly coiled.

If you have an ESC or servo on which the lead is made up of three strands twisted together, you'll know that this can't be coiled. In cases like this, I'd neatly fold the excess wire until it's the length you want, then use a zip-tie to keep it in place. You could pick up bright, fluorescent zip-ties at the hobby shop or hardware store, but be sure to use the same color throughout the chassis; nothing looks worse than having zip-ties of several colors on your car.

4. Use anodized hardware. This is by far the coolest way to customize your chassis. I have just one rule: choose one color and stick with it. You don't want your chassis to look like a rainbow. Granted, some colors complement each other, but in most cases, having more than one color just looks cheesy.

Trinity* and Associated* sell light, anodized-aluminum screws to suit many cars and trucks. OFNA* offers an assortment of 4mm and 5mm anodized lock-nuts and washers in a variety of colors, and they're great for metric



Heat-shrink tubing makes your wiring jobs look more professional. Star Brite's liquid electrical tape is one of the best products to come around in a long time. Add a drop of it to the exposed wire, and in minutes, it dries to form rubber. I've found dozens of uses for this stuff, and I always have a tube of it in my toolbox.

applications. Badd Boyz*, Fantom*, CRC* and Hammad Ghuman* also sell a ton of colorful anodized-aluminum goodies.

5. Use an onboard antenna. This is a must on scale-looking cars. Sure, you might lose a little transmitter range, but the farther away you drive your car, the less detailing you can see. When your car is detailed to the max, you'll want to keep it as close to

QUICK TIP OF THE MONTH

After spending countless hours detailing your rig, the last thing you want to do is crash it into a curb, or roll it end over end on asphalt. Pick up a second body and an additional set of wheels and tires for general thrashing. When you've finished playing, clean up your car, install your show body and wheels, then place it on a shelf where it belongs.

you as you can so you can appreciate your fine work. You can easily make an onboard antenna out of a small strip of Lexan.

If you want to get high-tech, Kose* sells a neat little onboard antenna that works well and looks cool mounted on your chassis.

OK. That's all for this month, but stay tuned because we have a lot of cool "Concours Corner" columns scheduled.

*Addresses are listed alphabetically in the Index of Manufacturers on page 184. ■

Nothing ruins a car's scale looks more than a giant antenna poking through the front windshield. You could easily make an onboard antenna using a strip of Lexan, or you could pick up one of these cool Kose onboard antennas and be the talk of the track. Whatever you do, don't expect to win a concours trophy with an ugly antenna tube installed.





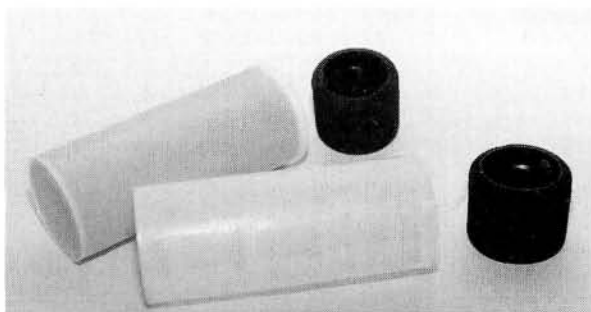
Helpful Hints from the Secret Lab

WHEN YOU SPEND all of your time cooped up in the secret underground laboratory as do, assembling, repairing and modifying virtually every R/C car and truck in the known universe, you learn how to do a lot of things quickly and easily. On the occasions when I head for the track or the parking lot and see other people work on their cars, I pick up on their little secrets and mistakes. That's when I pull out my little

IT'S A TIRE CONTAINER! NO, IT'S A REFRESHING BEVERAGE!

Over the past couple of months, the secret underground laboratory has been completely renovated and enlarged. It was kind of messy and inconvenient for a while (all those construction workers were gettin' in the way of my R/C'in') but, in the long run, it was well worth it. Since this was happening during the hottest time of the

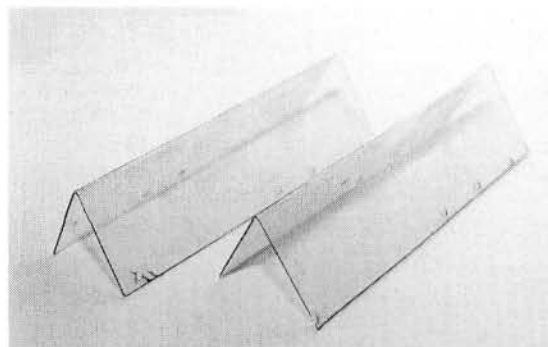
year, I felt compelled to provide cold drinks for the workmen. A trip to the grocery store netted me some crystallized pink lemonade that the construction dudes were happy to slurp down by



This Crystal Light soft-drink container holds two full-size pairs of front and rear 1/10-scale foams. You'll find many more useful containers by perusing the aisles of your local supermarket.

black book and write down what I've seen. I'll take an idea or technique back to the lab, test it out until I'm sure it works, share it with some of the members of the inner circle to see how easily they pick it up, and then—and only then—does it appear in the pages of *Radio Control Car Action* for you to read. Maybe if Frank and John would let me out of the lab more often, I'll get the chance to pick up these tips more quickly!

the gallon. When I bought it, I had remarked on how unusual the packaging was: a tall, plastic cylinder with five, smaller, sealed tubs of drink-mix crystals inside. Apparently, this stuff absorbs water so well that you have to protect it from humidity or it just clumps up into a rock-like form that doesn't dissolve. Later that same day, I went to the track and saw the same container, but used in a very different way!



These power-supply holders were made of two pieces of scrap Lexan. They get the power-supply case up off the pit towel (you do use a towel, don't you?) and into the stream of cooling air from a small fan placed behind it.

After the first heat, Matt Jarrett (remember the Funkmobile owner?) pulled an alternate set of tires out of his pit bag. To keep them from drying out when they weren't being used, he used the same plastic container as the drink mix had come in! It was just large enough to hold a full set of brand-new front and rear wheels and tires, and the lid was so tight that it also kept the smell of the traction compound from bothering his family at home. "Wow!", I said, "That's a great idea; it really needs to go into *R/C Car Action*! I've never seen it before!" At that point, not one, but *three* other racers pulled the same type of plastic container out of their pit bags, so I guess that means it's a good idea!

A couple of days later, I was in the grocery store again, and I scoped out some of the other packaging to see if any other containers could be of use. I found drink containers that could hold off-road buggy wheels and tires (I measured) and even a brand of coffee whose sealed can would be useful to lug around a full set of truck tires. I'm sure if you go to the store and look around (take a

small ruler), you'll be able to find a container that helps you out, too!

POWER SUPPLY COOL-O-RAMA

Like many racers, I use a sophisticated DC-type battery charger to crank up my racing Ni-Cds before a race, and I use a power supply when I run indoors. Because of the nature of AC to DC power conversion, a certain amount of heat gets thrown off as those manic electrons are forced from 120 AC volts down to the 13 or 14 DC volts that most chargers require. We frequently use a small fan to direct a stream of cool air to the charger itself, but few of us think of the poor power supply. I certainly didn't, until one day when I picked it up to move my pit around and discovered how hot the case gets during use. Ouch!

Since then, I've always elevated my power supply on a pair of bent Lexan legs (the charger sits serenely atop them) and placed my cooling fan behind it, where the moving air can reduce heat from both the charger and the power supply. This keeps the case cool, and I have to believe that

the innards are happier, too. It may seem like a small thing, but I've been using the same power supply and charger for almost six years, and they've never been to the repair shop! I cut two 5x4-inch Lexan squares and bent them lengthwise into V-shapes. Because the opening runs front to back under the power supply, the entire case gets cooled instead of just the backplate.

WHAT'S THE DIFFERENCE BETWEEN TEENY AND TINY?

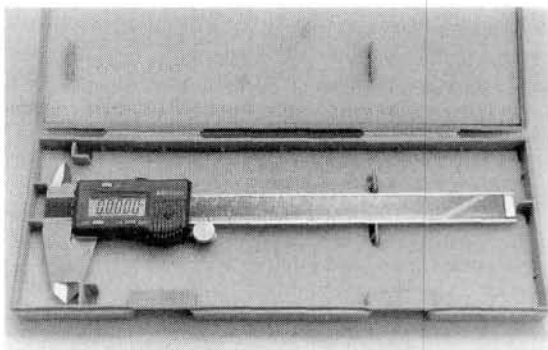
A couple of years ago, I started hanging out with a guy who's a master machinist: you know, the kind of person who looks at a chunk of aluminum and sees a steering spindle or an axle stub peeking out. I had always used a ruler or a cheap pair of plastic calipers to measure things, figuring that close enough was good enough. This guy forever changed my way of thinking. He talked in terms of tens of thousandths of an inch, and his equipment was really finely tuned. He's the only guy I've ever met who trued his tires on a full-size lathe!

One time, we were racing on a banked carpet oval and trying to find

the best front-end setup. I had five or six different sets of springs in front of me, and I was trying to decide which ones were stiffer by compressing them between my fingers. My buddy was horrified! He reached into his toolbox, and handed me a set

somewhere, right?

Since then, I've used the nifty Mitutoyo digital calipers you see here to measure everything from shock spring preload to flex-plate thickness and bearing diameter. It's a wonderful tool, and although it wasn't cheap



Good-quality vernier calipers help you to measure small things very precisely. These have a digital readout, but you can also find less expensive ones that have a dial gauge.

of really nice vernier calipers with a dial gauge meter on them, and he showed me how to measure the diameter of the spring wire properly. Not only had I mismatched some of the sets of springs (putting .020s with .022s and .024s), but I was also totally off on which ones were softer than the others. Yes, I know that the type of wire also has a lot to do with how stiff a spring is, but you have to start

(I paid \$90 for mine), it has paid for itself several times over just by making sure that the part I'm using is the correct size. If you can't swing the freight on a set for yourself, consider going in with a couple of friends you race with often, and share the cost.

THE MAGIC OF LIGHTER FLUID

What substance can you use to clean diff balls and rings, remove old servo tape from an electronic speed control or chassis plate and generally de-crud your ride? I must

(Continued on page 183)

Ah, lowly lighter fluid! One of the serious racer's best friends, it functions as an all-purpose solvent and cleaning fluid that removes gum, tire marks and decal glue without damaging Lexan or plastic. As an added bonus, almost all convenience stores carry it (in case you run out in the middle of the night!).



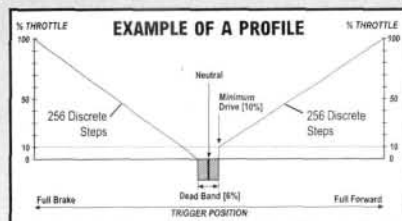
TEAM SECRETS

ESC PROFILE SOFTWARE

Last issue you were introduced to the Novak Cyclone's three selectable profiles and recommended uses. This Team Secrets further explains the programmable features of the Cyclone speed control, made possible with Novak's ESC Profile Software (#1030). PART 1 OF 2

The Cyclone incorporates **ten programmable functions** that can be accessed through the ESC Profile Software. The first three functions are **Neutral, Full Forward** and **Full Brake**. These are the transmitter reference settings taken from the One-Touch memory location and provide the default settings for the new profile which will be called **Profile 4**.

DEAD BAND: Space between brake and throttle, centered around neutral. Changing the Dead Band value will change when the throttle starts with respect to the neutral position (refer to graph below). Making the Dead Band value larger, will require more trigger movement to reach the first pulse of throttle in the forward direction. Conversely, making the Dead Band value smaller, will require less trigger movement to reach the first pulse of forward throttle. Also notice that the neutral position splits the Dead Band exactly in half, therefore; whatever change made to the Dead Band will affect the trigger movement in both the forward and brake directions in the same manner.



MINIMUM DRIVE: Percentage of throttle applied to the first pulse of throttle. Changing the Minimum Drive to a larger value will make the throttle start at a greater percentage of the full forward value. Changing the Minimum Drive to a smaller value will make the throttle start at a lower percentage of the full forward value. An adjustable minimum drive is an invaluable function when tuning different types of vehicles for various track conditions.

DRIVE FREQUENCY: Frequency at which the motor speed is controlled. Changing the Drive Frequency gives you the opportunity to change the manner in which the ESC responds to throttle input. Higher Drive Frequencies make the vehicle easier to drive on limited traction surfaces with modified motors, while lower drive frequencies are better suited for stock motors or surfaces with good traction. With the Novak ESC Profile Software, there are 16 Drive Frequencies to choose from.

TO BE CONTINUED.....Next issue the Brake PWM Frequency, Drag Brake Frequency, and Drag Brake Value adjustable functions will be examined.

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •

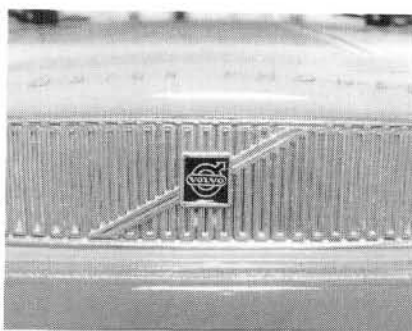
Advertisement

TAMIYA Volvo 850 BTCC

by George M. Gonzalez

THE FULL-SCALE Volvo 850 made its racing debut at the 1995 British Touring Car Championship (BTCC). The two-man wrecking crew—British driver Kelvin Burt (car no. 8) and Swedish driver Rickard Rydell (car no. 3)—finished the season with an impressive six wins and 19 podium positions to seal the 850's reputation as a formidable piece of racing machinery. Much of the Volvo's success is directly attributable to a potent 2-liter, 5-cylinder powerplant that delivers a whopping 430hp. Its distinctive four-door body shell is reinforced with a tubular-steel roll cage and complemented by white and blue racing livery.

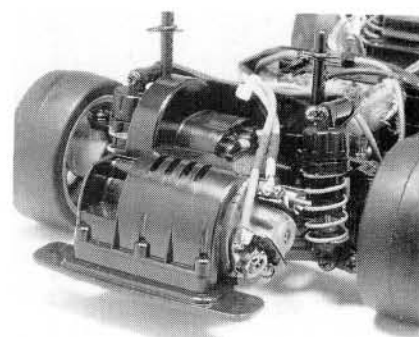
Tamiya* recently introduced an R/C version of the championship-winning Volvo 850 BTCC, and I'm glad to report that it's a nearly perfect 1/10-scale replica right down to its front-wheel-drive (FWD) configuration. This shouldn't come as a surprise; after all, Tamiya has built a reputation around its meticulously detailed bodies. So, does the R/C version live up to its full-scale counterpart's successful track record? I think so, and I'll tell you why.



Accents like this chrome front grill enhance the Volvo's scale looks. It's little details like this that make it so much fun to drive.

THE KIT

Under the Volvo 850's colorful body shell you'll find one of Tamiya's unique TA02 FF chassis. For those of you who are not familiar with the "FF" designation, it stands for front motor, front-wheel drive. I found it interesting that much of this car's technology was adopted for the company's most recent endeavor, the TA03F. The biggest difference, though, is that the

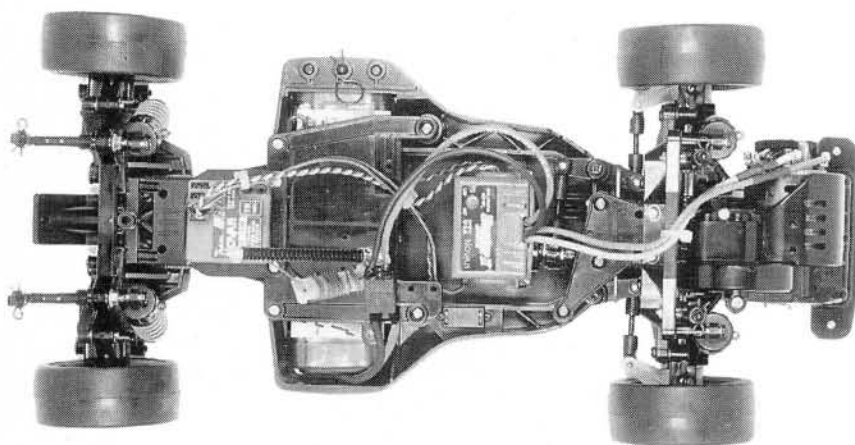


The business end features a radical front-mounted-motor design. Inside the gearbox, you'll find a high-performance ball diff. Two spur gears allow two possible final gear ratios—added tunability. The Reedy Conquest 14-turn motor packs a hell of a wallop.

TA03F uses a belt and pulley system to transfer the power from the front-mounted motor to a rear gearbox, which, in turn, provides full-time 4WD. Of course, there's no rear gearbox on the FF, so the front wheels do all the pulling.

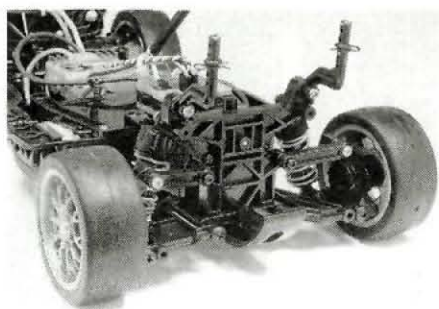
An extremely durable (and very familiar) plastic bathtub chassis provides plenty of room inboard to mount all your R/C electronics and also serves as a foundation for the front gearbox and rear bulkhead. The included bellcrank steering system is a basic piano-wire drag-link affair; however, this unit actually works smoothly and is slop-free. Slop bellcranks have plagued many Tamiya kits in the past, so I was pleased to find that the company has addressed this problem and corrected it on the FF.

On all corners, you'll find molded, lower suspension arms with fixed upper links as well as plastic-body, oil-filled shocks. The fixed upper links don't allow any sort of camber adjustment, but they provide just the right amount of camber (according to my trusty RPM* camber gauge, approximately 1/2 degree of negative camber on all wheels). Some racers may complain about the plastic-body shocks, but the truth is, the stock units are extremely smooth and provide excellent



A bird's-eye view shows the many mounting choices for the electronics. The Novak Duster II ESC is a real gem; a lightning-fast Airtronics 94157 servo keeps the Volvo right on track; and Tamiya tuned springs and bearings and Tozai slicks transform this car into a potent performer. How about that Kose onboard antenna?—pretty sweet.

This Ain't Your Mom's Volvo



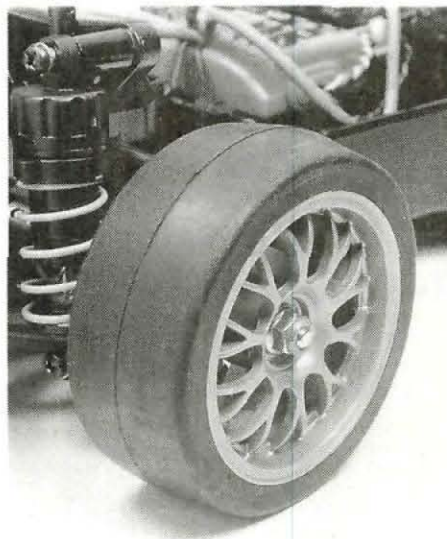
Not much going on back here, huh? Hey, all the guts are up front. I might eventually add adjustable camber links, but why should I? Tamiya's legendary plastic shocks are fantastic! The red tuned springs, 3-hole pistons and 80WT shock oil prevent the rear end from skating all over the place. I really like the nifty little bumper.

damping. I honestly believe that the optional aluminum-body shocks don't offer any advantages over the plastic units other than that they look more trick and possibly last a bit longer.

The front gearbox is perhaps the car's most interesting feature. The motor is up front (actually in front of the wheels) as it is on most full-scale cars. This allows the Volvo to handle much like a full-scale FWD car, and that adds greatly to the driving experience. The gearbox features an extremely efficient 3-gear format, and all the gears spin on stainless-steel gear shafts helped by plastic and metal bushings. A high-quality, adjustable ball diff comes standard—a nice touch.

THINGS YOU'LL NEED

- 2-channel radio with receiver and two servos (or one servo and an ESC).
- 7.2V battery pack.
- Battery charger.
- Paint for the Lexan body.



The Volvo's stock BBS-style wheels look really cool. I saw one with the mesh part of the wheel painted jet black. It looked incredibly realistic. Don't laugh when you hear this, but I was thinking of painting mine yellow to match the body.

specifications

SCALE 1/10
LIST PRICE \$276

DIMENSIONS

Length (overall) 17½ in.
Wheelbase 10 in.
Width (F/R) 7⅞ in.

WEIGHT (RTR) 3 lb., 3.6 oz.

CHASSIS

Type 1-piece tub
Material ABS plastic

DRIVE TRAIN

Type Sealed 3-gear
Primary Pinion/spur
Transmission Stainless-steel dogbones/axles
Differential(s) Ball
Slipper clutch None
Bearings/bushings Plastic and metal bushings

SUSPENSION (F/R)

Type Lower A-arms w/fixed upper links
Damping Plastic-body, oil-filled, coil-over shocks

WHEELS (F/R)

Type: One piece plastic
Dimensions (DxW) 1.875x1 in.

TIRES (F/R) Tamiya standard-compound rubber slicks

ELECTRICS

Motor Mabuchi 540
Speed control 3-step w/forward and reverse
Battery Not included

TAMIYA VOLVO 850 BTCC

Unlike some of Tamiya's other touring cars (specifically the TA02), the pinion/spur-gear mesh is completely adjustable (no preset mounting holes here). I love this feature because the gear-box will accept an assortment of pinion gears ranging from 20 to 25 teeth. In addition, two spur gears are included with the kit (66 and 71 teeth), and that allows you to install a torquey competition stock motor without having to pick up additional pinion gears.

As mentioned earlier, the Volvo 850 body is up to Tamiya's usual high standards. It comes with a film coating that



Likes

- Scale looks are second to none.
- Easy—and fun—to build.
- Drives just like a full-scale FWD car.
- Superior parts quality.
- The best instructions in the business.
- Endless hop-up potential.



Dislikes

- Replacement bodies are expensive. Ah, the price of beauty!

protects it from being scratched during shipping and from overspray when it's being painted. To ensure proper body mounting, all the body-mount holes are pre-drilled. Tamiya even provides holes for mounting the rear deck wing and dimples for mounting the side mirrors (talk about a no-brainer!).

Included with the body are side mirrors, a chrome front grill and a plastic rear spoiler. Of course, a set of sponsor decals allows you to replicate either of the two BTCC 850s (no. 3 or no. 8). In addition,

FACTORY OPTIONS



- FWD touring-car ball-bearing set—part no. 53137.
- TA02 and FWD FRP chassis—53166.
- Low-friction aluminum damper set—53155.
- On-road tuned-spring set—53163.
- Turnbuckle upper arm set—53192.
- FWD aluminum motor heat sink—53177.
- TA02 and FWD universal-shaft set—53172.
- Aluminum kingpins—3157.
- Hollow carbon gear-shaft set—53165.
- 3x10 titanium tapping-screw set—53095.
- 3 mm tungsten-carbide diff ball set—53124.
- Aluminum diff pressure plate—53219.
- Hard joint cup set—53217.
- Aluminum front hub carrier—53226.

Get Ready to Race

Right out of the box, the Tamiya Volvo 850 BTCC is a very competent performer. And as you can see from the list of factory options, it also has some serious hop-up potential. This list shows only the tip of the iceberg, though, because several aftermarket companies also make hop-ups for the Volvo, and you could conceivably transform it into a \$1,000 supercar. The fact remains, however, that very few optional parts are needed to make it a highly tunable racer. Keep in mind, though, that if you'd like to compete in the Tamiya Championship Series, you're allowed only Tamiya hop-ups. For your convenience, I've compiled a list of goodies that will dramatically improve the car's performance without emptying your wallet in the process.

PERFORMANCE HOP-UPS

1. Ball bearings. In my opinion, these are vital to an R/C car's performance. They operate with less friction than bushings, and they don't require much maintenance. A car that is equipped with bearings runs smoother and faster and is more reliable than a car with bushings. Tamiya offers a nice set of rubber-sealed maintenance-free bearings (part no. 53137) that are well worth the investment.
2. Tuned springs. The springs included with the Volvo are good for bashing around driveways and street corners, but if you want to compete, you'll need several springs with differing spring rates. Tamiya offers a great set of tuned springs (no. 53163) that come in three colors/rates that allow precise shock tuning.
3. Shock oil. A good selection of silicone shock oil is a must. Associated*, Losi*, Trinity and Tamiya all make high-quality silicone shock oil in a variety of weights. If I were on a limited budget, I

would buy 20WT, 40WT, 60WT and 80WT. With this selection of shock oil in your toolbox, you'll be able to dial in your car on any track.

4. Tires. The slick tires supplied are great for cruising around the neighborhood, but they just won't cut it during heated competition. If you can afford it, buy two complete sets of tires (eight in all)—a set of HPI V-Groove Super Radials and a set of Tamiya Super Slicks. With this combination, you'll be able to get the Volvo hooked up on any track.

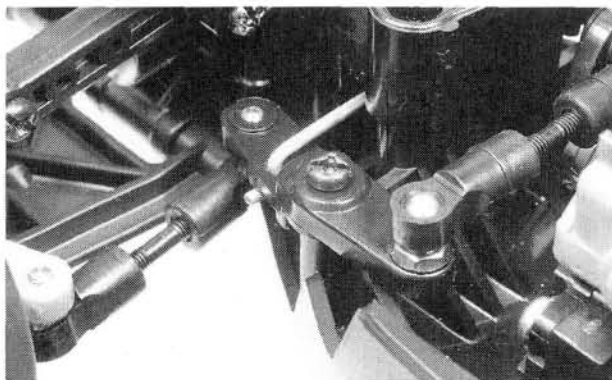
STARTING POINTS

It's always good to have a starting point, and since the instruction booklet doesn't include any racing setups, I thought that Dave Jun of Tamiya America might be able to point me in the right direction. I tried his setup recommendations on my car, and I was dialed from the git-go.

- Springs: Blue (firm) up front; Red (soft) in the rear.
- Shock oil: Associated 80WT front and rear.
- Shock pistons: one-hole pistons in the front shocks; three-hole pistons in the rear.
- Shock limiters: one thin (V11) and one thick (V3) inside all four shocks.
- Shock preload spacers: one thin on each front shock; none on the rear shocks.
- Tires: HPI V-Groove Super Radials or Tamiya Super Slicks front and rear, depending on track conditions. Don't mix radials with slicks.
- Toe-in/out: zero toe-in. If you need more steering, try 1 degree of toe-out.
- Diff setting: very tight.
- Body: Tamiya Volvo or Mercedes C-class.

No doubt, this car has Tamiya's signature all over it. This is one of the best-looking bodies I've seen. You'd be surprised at just how much a detailed body adds to your driving experience.





The FF chassis has a relatively slop-free steering-bellcrank system—way to go, Tamiya! To handle the steering chores, I opted to use an Airtronics 94157 high-speed servo.

there are decals for all the window moldings, front and rear illumination and various other details. The best part is that the sponsor decals could be omitted and the car could be decked out as a lean, mean street machine.

The included gray-spoke racing wheels are faithful to the BBS wheels that grace the full-scale racing 850. The stock kit rubber slick tires come with foam inserts and seem to work best on clean, well-groomed tracks. Most serious racers and parking-lot warriors will opt for a set of high-quality racing tires somewhere down the road.



Building & Setup Tips

Tamiya's smart packaging and excellent instructions will get you through the assembly without a glitch. I won't waste your time with the usual building tips; instead, I'll focus on the most difficult part of building the Volvo—or just about any Tamiya touring-car kit for that matter. I'm talking decals, folks. And the Volvo 850 BTCC has nearly 100. Painting it is a simple matter; it's white except for the dark blue trim on the front air dam.

Because I'm a nonconformist, I painted my Volvo with Pactra® Daytona yellow R/C paint. Hey!; come race day, my Volvo won't get mixed up in a field of white and blue 850s, and it's bright enough to blind my competition! You could paint yours to look just like the full-size car or choose any color you like. Just be sure to choose a shade that will complement the graphics.

Here's the best way to apply decals. Put a couple of drops of dishwashing soap into a shallow bowl, then fill the bowl with warm water. Using sharp scissors, cut each decal out as close to the trim lines as you can. Next, remove the decal's backing and dip the decal into the soapy water before applying it to the body. Because the decal is applied wet, you'll have a minute or so to position it correctly before it dries and sticks.

On the larger decals that have to conform with the body contours, follow the same

procedure, but use warm air blown from a hair dryer to help stretch the decal into place. You can also use the hair dryer to dry the smaller decals quickly after you've applied them. Be careful, though; too much heat could soften them and make them easy to tear.

First, apply all the window moldings, then concentrate on the larger graphics and sponsor decals. Finally, apply the front headlight and rear brake-light-lens decals. Trust me on this; if you apply these particular decals first, you might run into a problem when you apply the larger wraparound graphics. This happened to me, so I'm talking from experience.

I wouldn't bother to put the Michelin logos on the tires because they're bound to fly off the first time you run the car. In addition, I recommend that you remove the side mirrors whenever you run the car. They'll get damaged or be completely ripped off the body as soon as you roll the car over or whack a curb.

Let's face it: if you race, you know that R/C bodies take a lot of abuse. After spending days on painting and detailing the Volvo 850 body, the last thing you want to do is destroy it while racing. I usually keep my Tamiya bodies for display and race with less expensive bodies. The Volvo body set that includes decals cost somewhere in the neighborhood of \$50. An HPI®, Protoform®, or Frewer® body may be snatched up for less than \$20. It's something to think about.

TEST GEAR

- Airtronics® Caliber 3P transmitter
- Airtronics 94157 high-speed servo
- Novak® Duster Sport II ESC
- Novak NER3FM receiver
- Reedy® Conquest 14-turn modified motor
- Trinity® Ex-Tech 1700mAh battery pack
- Tekin® BC67 peak charger
- Deans® Ultra Plugs
- Kose® onboard antenna

PERFORMANCE

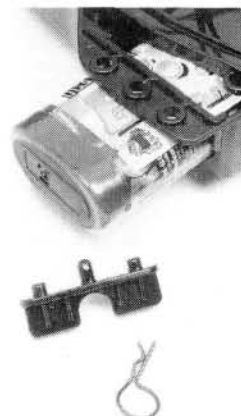
I had raced a few of Tamiya's other FWD cars, so I was immediately comfortable with the car's handling characteristics. Most of the other Tamiya FWD car kits come decked out with a compact body like the Honda Civic or Toyota Celica. The Volvo 850 is the first FWD car to use a full-size touring-car body design. The larger body shell seems to provide just as much steering response as the smaller ones, but the big advantage is that the tail end seems to stay planted even when the car goes through the sharpest turns. This is especially advantageous when you're

negotiating a tight roadcourse with an intricate infield section.

The Reedy Conquest motor packed a wallop and had the Volvo's front tires spinning. The mighty Airtronics 94157 steering servo kept the front tires pointed in the right direction and centered perfectly every time the wheel returned to the neutral position. I was also pleasantly surprised with the Novak Duster II ESC's performance. I honestly believe that for the money, you could not do better than the Duster II. It's smooth, reliable and inexpensive (three characteristics I've grown to love). The Duster II also includes a cool brake-light set that adds greatly to the driving experience. It's also great for getting those inconsiderate tailgaters off your butt in traffic!

I immediately noticed the shortcomings of the stock kit tires as the car pushed its way through the turns and slid out under power. After I had installed a complete set of Tozai® C-compound slicks, I had the car darting around with cat-like finesse. I have no doubt that with a few minor hop-ups (see racing sidebar), this car could be transformed into a worthy competitor. And for those of you who have inquiring minds: yes, the FWD configuration definitely provides a higher top speed (less drag) than Tamiya's 4WD configuration. Sorry, that little devil on my shoulder made me say it!

Tamiya's battery hold-down system. Simple and reliable, it won't fit side-by-side racing-style stick packs, though.



FINAL THOUGHTS

If you're looking to join the parking-lot racing craze that's spreading over the planet like some sort of welcome chain letter, consider this car. The Volvo 850 looks cool, performs exceptionally well and is extremely easy to build. What more could you ask for? Well, maybe it's best that you don't answer that question.

*Addresses are listed alphabetically in the Index of Manufacturers on page 184.

RABORN RACING Invencer

by Dale Kote

It's about time someone produced an all-new, purpose-built oval-racing truck. Raborn Racing* has done this and, in the process, taken oval trucks one step further. What you see at every track are off-road trucks that have been converted to oval. This conversion usually consists of a flat, graphite chassis (similar to pan cars), shorter shocks, different tires

and so on. By the time you change all this, you have probably spent as much as the truck's original purchase price. At last, there's an oval truck that was made for the job: the Raborn Invencer XT.

KIT FEATURES

- **Chassis.** I received this truck already built, but as soon as I could, I took the body off to see what it looked like underneath. The truck uses a graphite chassis with an upper stiffener plate that runs front to back. The batteries are held in slots on the chassis (four on the left and three on the right), and that allows the use of a 7-cell saddle pack (for you speed demons out there). The chassis is very strong; it doesn't flex or twist.

- **Suspension.** The front suspension is mounted on a two-piece bulkhead that's attached to the chassis with four screws. By simply

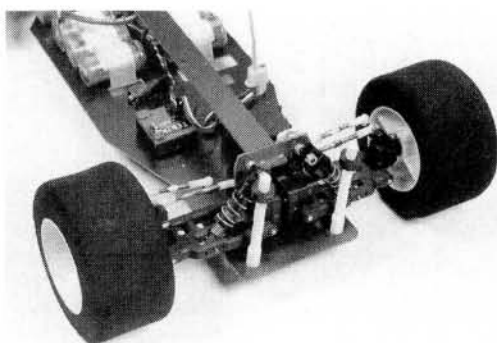
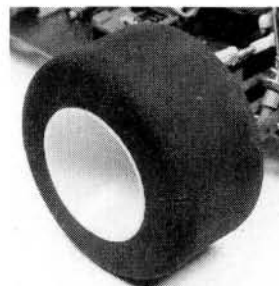
mounting the A-arms in different positions on each bulkhead, left- and right-side caster can be set individually—a nice feature for oval racing. The only problem is that the front shock mount is a solid piece that's mounted on the two-piece bulkhead, and that prevents you from making individual left and right camber adjustments. Did something slip through the cracks here or what?

I called the folks at Raborn, and they told me that on the Invencer car version—the X-10—a two-piece shock mount is included, and it allows individual left and right caster adjustments. If you like, you can do without the individual caster adjustment and settle for the one-piece shock mount, or modify the brace by cutting it in half to make it a two-piece unit. Or you can purchase the car version's shock mount, which is available from Raborn.

Both front and rear hub carriers feature two sets of holes through which the suspension arm's pivot pin can be mounted. This adjustment allows you to set the truck's ride height; the upper hole will lower the truck, and the lower hole ...

The Invencer comes equipped with these trued and mounted foamies. Grooves can be etched in to provide more bite on dusty tracks.

Overall, these tires worked great, and it seems as if they'll last a very long time.



The front end has adjustable caster, camber and toe-in/out. The hard-anodized Delta shocks are first class. The suspension components are molded from a very rigid material, and this makes the suspension work more precisely.



Building & Setup Tips

My Invencer came fully assembled, so I can't give you any useful building tips. The instructions that come with the kit could use some additional text as well as some more photos or illustrations, but when I think about it, there really isn't much to this truck, so I think if the builder pays close attention to the instructions, a correctly built Invencer will be the result. Here are just a few setup tips that worked for me, but I recommend that you only use these tips as starting points because conditions vary greatly from track to track.

- I built the shocks using 20WT silicone oil up front and 15WT oil in the rear.
- For starters, I adjusted the spring pre-load evenly on all four shocks, but I knew some

additional tweaking would be necessary once I got the truck making laps on the track.

- The truck comes with a 108-tooth, 48-pitch spur gear, so I figured I would use a 19-tooth pinion gear.
- I ran the truck with the caster set the way it was when I received the truck, i.e., with the least amount of caster. I've yet to change it.
- I adjusted camber to +2 degrees on the left and -2 degrees on the right.
- I highly recommend that you set up the rest of the truck as instructed in the manual. Gradual adjustments will be necessary, but these setup tips should get you pointed in the right direction.

Purpose-Built Oval Racer



well,
you get
the picture.

The rear suspension is also mounted on the chassis using separate bulkheads, and the bearing-supported differential is mounted between the halves. In addition, on the rear bulkhead halves, there are two mounting holes that allow you to adjust the wheelbase by moving the entire rear end forward or backward about 1/2 inch for added tunability. The small, pressurized shocks used are very similar to those seen on some pan cars, but these

units are a little larger and are hard-anodized and Teflon™ coated, which you would expect on a sophisticated oval truck such as this.

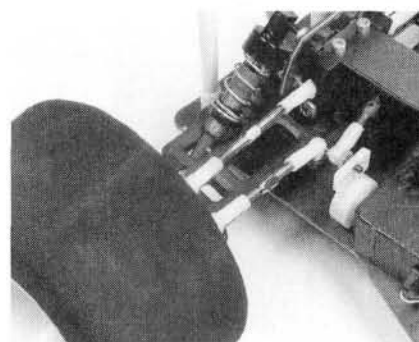
• **Drive train.** A very simple, but effective, direct-drive system strongly contributes to this truck's ballistic speed. The system is very light and efficient, which is not the case with those on many of the gearbox-type oval trucks. The adjustable ball diff is extremely smooth, and it can be adjusted without removing the drive shafts—a really nice feature! The diff also includes a locking mechanism that eliminates the differential action altogether. It's a feature I've yet to use, but one that might come in handy for very high-bite tracks on which a locked diff might help slide the rear end through the turns. Or, maybe it will work for drag racing! Hmm?

One of the features that I like best is the extensive use of purple-anodized aircraft-aluminum hardware. The motor mount, diff halves and outdrives have all been given this beautiful anodizing treatment. Hey, finish out the truck with some Trinity* lightweight purple-anodized screws, and you could make it look even more high-tech!

• **Wheels, tires and body.** The Invencer comes with one-piece, lightweight, nylon wheels with truck-size foam tires already mounted and trued.

These tires can easily be grooved to suit a variety of surfaces. They can also be trued down to a smaller diameter,

or if the track surface permits, you can choose to run a stagger like the banked-oval guys. Many truck-size foam tire donuts are available in several compounds. The stock, medium-compound



The Invencer features a really trick rack-type steering bellcrank. I added Lunsford Punisher titanium tie-rods to aid in camber adjustment. Notice how the shock bodies are threaded for simple and precise spring pre-load.*

Specifications

SCALE 1/10
LIST PRICE \$350

DIMENSIONS

Length overall 15.5 in.
Wheelbase 11.25 in.
Width (F/R) 10.75 in.

WEIGHT (gross, RTR) 3 lb., 4 oz.

CHASSIS

Type Flat plate with upper brace
Material Graphite

DRIVE TRAIN

Type Direct drive
Primary Pinion/spur
Transmission Universal sliders
Differential(s) Adjustable ball
Slipper clutch No
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Individual A-arm w/adjustable upper link
Damping Oil-filled, coil-over shocks

WHEELS (F/R)

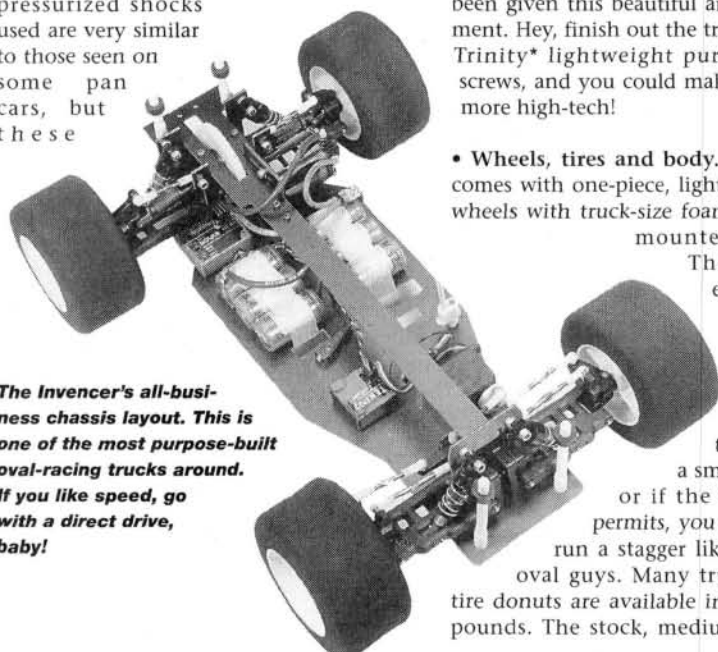
Type Nylon rims
Dimensions (DxW) 2.25x2 in.

TIRES (F/R) Medium-compound foam

ELECTRICS

Motor, battery, ESC Not included

The Invencer's all-business chassis layout. This is one of the most purpose-built oval-racing trucks around. If you like speed, go with a direct drive, baby!



RABORN RACING INVENCER

foam tires will work on most surfaces.

The included truck body falls into the love/hate category. I'm not too fond of it, but that's my opinion. I voiced this to associate editor George Gonzalez, and



- Aluminum spring retainer—part no. 2081.
- Double O-ring seals—2084.

he told me to use the included body and like it! Just kidding; George made some calls and arranged to have a Dahm's* Rough Enough SE dirt-oval truck body (part no. D027) custom-painted by the "airbrush wizard" himself, Scott Bich from Bich'n Bodies*. Check out the "Ortho Lawn & Garden" Supertruck motif—very, very cool! The graphics are very fitting, because ever since I got this truck, I've been mowing down my competition.

TEST GEAR

I set up the truck with a Novak* 410 M1c speed control, a Tekin* AM receiver, a Futaba* S132H servo, a Futaba Magnum Junior radio and some matched Sanyo 1400 cells. For starters, I opted to use Trinity's Midnight stock motor.



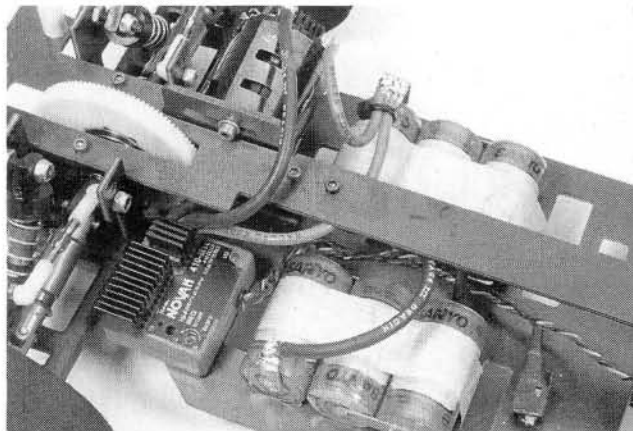
Likes

- Direct-drive gearing: low drag, low rotating mass and low maintenance.
- Awesome shocks that are simple to adjust.
- Super-smooth adjustable ball diff with lock-up mechanism.
- Plenty of suspension-geometry settings.
- Very lightweight.
- Killer purple-anodized aluminum hardware.



Dislikes

- Front bulkheads can twist in a hard crash.
- Steering rack has a little too much play in its mount.
- Some of the suspension hinge pins had too much play.
- At some tracks, direct-drive trucks might not be legal in the same class as the gearbox trucks.
- Doesn't come with a front bumper.



The way the motor, batteries and ESC are mounted ensures that all the wires will be short. Of course, I hard-wired my electronics because I'm funny that way. I can't wait to fill that extra battery slot and bolt in a nasty modified motor.

PERFORMANCE

I first took the truck to an asphalt parking lot. The pavement is older, so all the stones are worn through, and it was fairly abrasive. I set up corner markers that created a medium-size, 150-foot centerline oval, and I got down to business. As soon as I squeezed the trigger, the truck took off, and as soon as I attempted to turn (about 10 feet in front of me), it promptly spun out. I loosened the diff a little and lowered the rear ride height by unscrewing the rear shock collars a little, and it felt a lot better. The truck was still very loose coming off the corners under power, so I softened the right rear more and stiffened the right front a little, backed off on the torque setting on the speed control a bit, and it started to really hook up off the corner. As I got used to the instant response and great top end that comes with the direct-drive gearing, I was sorry that I hadn't brought a modified motor with me. Within two battery runs, I felt the truck was competitive for asphalt-oval racing.

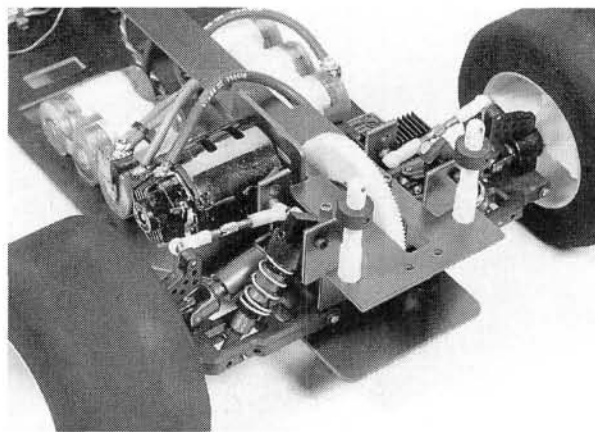
After that, I packed up and headed for dirt. I knew of a construction site that had a really flat area, and it was decent hard clay, but it did have some loose dirt on top. Again, I set up corner markers, this time to make an oval of about a 120-foot centerline. At first, the truck was so loose under power that it wasn't driveable. I made more suspension adjustments,

backed off on the torque setting, and still had to go to softer motor springs (less punch from the motor) to get it through the corner consistently. In all fairness, the smooth foam tires could not get any bite through the loose dirt on top. I think that if I grooved the rears similar to sprint-car tires and cut small ribs in the fronts, the truck would be more driveable. Once I got some laps down and got the loose dirt out of the groove, it was better yet.

FINAL THOUGHTS

I am impressed with the Invencer. I think this truck will be a killer on carpet, asphalt, or concrete ovals of any size. I guarantee you will run faster lap times on these tracks with this

truck than with your gearbox oval truck. The truck can also be a winner on larger, very smooth, tacky-clay ovals. On the downside, I think that if you race on a smaller, not-so-perfect dirt oval, this truck will not perform better than a gearbox truck because the direct-drive gearing and



Do I need to say anything? This is one sweet-looking rear end. Direct-drive gearing and adjustable everything—cool! Check out the aluminum motor mount and all the camber-link mounting options on the rear axle carriers.

the mid-mounted motor make it just too touchy to whip around tight corners consistently. My experience testing the Invencer XT was very pleasurable. The truck responds predictably and accurately to all of its adjustments. I had no problems with anything breaking or loosening.

**Addresses are listed alphabetically in the Index of Manufacturers on page 184.*

Sanyo RC-2000 Cells

Longer run time,
more punch

by Frank Masi

After nearly five years of dominating the R/C battery market, Sanyo has ceased production of its 1700SCRC "black" cell and has replaced it with a higher-capacity, higher-voltage cell, the RC-2000—the first cell made specifically for the R/C hobby. Previously, all cells were cross-overs from other applications—power tools and medical devices, for example. They account for the majority of Sanyo's battery sales while the R/C market accounts for less than 1 percent of the company's cell production.

During early tests, Trinity found that most of the new RC-2000 cells had capacity in excess of the specified 2000mAh. As evidenced by the label shown below, this RC-2000, having gone through Trinity's VIS EX-TRA voltage-increasing system, has a capacity of over 2,300mAh, run time of 277 seconds at a 30A discharge rate, a low internal resistance number of 29, and a very high voltage of 1.13.

The question that's undoubtedly on the minds of R/C hobbyists is why has Sanyo phased out the venerable 1700SCRC? One year ago, Sanyo made design changes to the 1700 that, on paper, shouldn't have altered the cell's performance characteristics. Although these new "T"-stamped cells met Sanyo's voltage/capacity specs, battery matchers found that they vented more easily during the cycling process and lacked the performance consistency of the earlier 1700s. As a result, Sanyo's previous "E"-stamped cells became a rare commodity at the track—and gave their owners a



Legal Issues

Since news of the new Sanyo RC-2000 spread far and wide, there has been a lot of speculation and rumor about its legality. As of January 1, it became legal for all ROAR-sanctioned races. As I write this, the cells are legal only in a special "pro" oval class at NORRCA-sanctioned events.

The RC-2000 cells are being shipped to Asia and Europe, so I suspect that they'll soon be legal for IFMAR world championship competition as well.

performance advantage over the "have-nots."

Battery matchers and consumers alike complained about the new cells, at which point Sanyo could either have fixed the existing 1700s or, considering how small the R/C market is in relation to Sanyo's worldwide Ni-Cd production, dropped out of the R/C market entirely. Fortunately for us, Sanyo chose not only to stay in the hobby market, but also to create an all-new cell, the RC-2000, just for the hobby market.

A CELL JUST FOR US

As mentioned, the RC-2000 is the first cell designed specifically for the R/C hobby. As such, it

has the performance characteristics that are most important to R/C racers: high voltage (more speed), higher capacity (longer run times) and low internal resistance (increased "punch" and better acceleration).

Says Ernie Provetti of Trinity Products*—the exclusive U.S. importer of the Sanyo RC-2000 cell: "In comparison with the 1700SCRC—long acknowledged as the high-performance cell in the R/C market—we find that, when discharged at 30 amps, the RC-2000 cell exhibits similar voltage [1.07 to 1.09]; however, run time is much greater than with the 1700SCRC by an average of 20 seconds, and the 2000 has lower internal resistance. Some of the new cells have resistance as low as 25; 1700s averaged 29.

"Also, we're finding that the RC-2000 cells are much more consistent than the old 1700s across the board. In essence, there are far fewer cells that won't make the cut during the matching process. To the consumer, this means that you'll be able to buy a few, high-quality matched packs with confidence instead of having to buy 20 packs just to find six good ones."

With the new 2000, durability—a critical factor when you take into consideration the expense of batteries and the punishment they must endure (especially in off-road)—is also markedly improved. The credit for increased longevity must go to the cell's design and manufacture; Sanyo has created a cell with higher capacity (2000mAh vs. 1700mAh) yet the same physical size as the previous 1700. When discharged at similar rates, a cell that has higher capacity is less likely to

be damaged than one with a lower capacity. Also, Sanyo builds the new RC-2000 cell to tighter specifications; in fact, Trinity claims that the first batch of cells tested yielded a range of only 6.5 percent difference in run time between the best and worst cell and that all the cells tested above 2000mAh (some were significantly higher).

TRACK TESTING

The *Car Action* staff had the opportunity to test some of the early RC-2000 cells under race conditions, and we were quite impressed with the additional run time. One editor noted that he was able to practice with his off-road truck for 4 minutes (using a modified motor), come back to the pits for some chassis tweaking, then go back out for another

4 minutes—all using the same charged pack.

The big question is: can you gear up with the new cells? Yes, but keep in mind that the higher the motor is geared, the hotter it will become—and the shorter will be its life. As an alternative to gearing up, the new 2000mAh cells' extra capacity will allow you to use a hotter



Although you won't notice the RC-2000's higher capacity as much during a 4-minute off-road race, the additional capacity and improved manufacturing specs help the new cell to better withstand the rigors of off-road, e.g., high-heat, low-turn motors and often abusive charging methods.

modified motor without fear of dumping. In fact, some new motors, such as Trinity's new D2, have been designed with thicker armature web-sections to take advantage of the RC-2000's capacity.

Because of their low internal resistance, we noticed an increase in "punch" when using the 2000s instead of the 1700 cells. Under most circumstances (except in stock-class racing), we found that adding one or perhaps two teeth to the pinion gear made the car or truck smoother and easier to drive without sacrificing run time. With the higher gear ratio, top speed was, of course, almost beyond control.

THE HARD CELL

The new Sanyo RC-2000 gives us more run time and power, and it's much less likely than 1700SCRC to be damaged during normal use. The only tradeoff is a price increase; expect to pay about \$10 more per pack. Obviously, the more highly conditioned cells, i.e., top-of-the-line matched packs and cells that have gone through Trinity's VIS EX-TRA (voltage increasing system) process, will cost more than standard matched packs. But if you check the numbers carefully before you buy, you'll find that, for about the same price, you can probably get a pack of matched RC-2000 cells whose capacity and performance exceed those of your best 1700mAh pack. And you get a tougher cell in the process. Should you throw out your 1700s right now? No, but when it's time for new batteries, go for the 2000s; they are truly better.

*Addresses are listed alphabetically in the Index of Manufacturers on page 184. ■

...the RC-2000
is the first
cell designed
specifically for
the R/C hobby.

Charging the RC-2000

Despite its increased capacity, the Sanyo RC-2000 cell needs no special treatment. In fact, it appears to be the most rugged sub-C cell ever produced.

The best way to charge your new 2000mAh packs is at 5 amps on a reliable peak-detection charger. You can charge at a higher rate, but most experts agree that 5 amps provide the best combination of run time and power. As with any Ni-Cd battery, heat is the enemy, so avoid over-charging at all costs.

To discharge, place a load (anywhere from 10 to 30 amps) across the battery after every run. Do not allow the voltage in any cell to go below 0.5 volt during discharge, or you risk damaging the cell (this is important). Many companies sell voltage cut-off devices; they go between the pack and the load source (often, a group of 12V automobile light bulbs).

thrash TEST

1/10 scale electric



TEAM ASSOCIATED by John Howell

B2 Sport

RECOGNIZING THE FACT that not every off-road racer or potential newcomer to off-road racing can afford the cost of a full-blown racer, Team Associated* has always produced entry-level versions of their top-of-the-line cars and trucks. Their philosophy is to offer a kit that racers can upgrade as their skills progress or budgets allow. In the past, Team Associated has produced winners with sport versions of most every off-road car and truck that they make, and their latest entry, the RC10B2 Sport, is sure to be a winner as well.

specifications

SCALE 1/10
LIST PRICE \$250

DIMENSIONS

Overall length 14.625 in.
Wheelbase 10.375 in.
Front width 9.875 in.
Rear width 9.75 in.

WEIGHT

Gross (ready to run) 3 lb., 9.3 oz.

CHASSIS

Type Plastic "tub" w/metal F/R plates
Material Molded composite/
hard-anodized aluminum

DRIVE TRAIN

Type Sealed gearbox (2.4:1 reduction)
Primary Pinion/spur gear
Transmission Universal-joint driveshafts
w/dogbones
Differential(s) Adjustable ball
Slipper clutch Adjustable friction
Bearings/bushings Oilite bronze metal
bushings

SUSPENSION

Type (F/R) Ind. A-arm w/upper
camber link
Damping Gold-anodized, coil-over,
oil-filled shocks

WHEELS

Front, type: Three-piece plastic:
fluorescent yellow
Dimensions (DxW) 2.15x0.75 in.
Rear, type: Three-piece plastic:
fluorescent yellow
Dimensions (DxW) 2.175x1.375 in.

TIRES

Front Associated TQ73/Pro-Line XTM 4-rib
Rear Associated TQ23/Pro-Line XTM
Step Pin

ELECTRICS

Motor DS Speed Motor
Battery Not included
ESC Mechanical resistor controller

World winning buggy on a budget

FEATURE-FILLED, ECONOMICALLY PRICED

The new B2 Sport shares most of its features with the full-blown B2 that won the IFMAR Off-Road World Championships in Tokyo, Japan. For those of you who are not that familiar with the B2, I'll give you a brief overview of its most important features, then move on to the subtle differences between it and the B2 Sport.

The most noticeable feature on the RC10B2 is its new chassis design; gone is the old aluminum tub chassis we've been accustomed to seeing over the years. The B2 features an all-new molded composite tub with angled side "pods" that provide maximum ground clearance and minimum drag. The nosepiece and rear chassis plate are made of hard-anodized aluminum for added durability and strength. A molded battery strap keeps the cells locked firmly in place—low and in the center of the chassis. The user has the option of placing the cells in the middle of the chassis or more toward the front or rear of the car to adjust weight distribution.

The race-proven, yet subtly changed, Stealth transmission design is part of the new buggy's design. It features a new, lower, 2.4:1 reduction ratio that makes it easier to properly gear hot modified motors and a larger-diameter differential that can handle more torque.

Both the front and rear suspension use stiff, molded-composite, long suspension arms. Coupled with Associated's ultra-smooth, hard-anodized Team Shocks (.89-inch front shocks, 1.32-inch rear shocks), the suspension easily handles any type of track condition. An in-line steering bellcrank assembly features a built-in servo-saver, and it has adjustable Ackerman.

Topping off the B2 is a new Mirage body that comes with pre-bent wing wire and Associated's standard off-road wing. The kit also comes with Pro-Line's* Flat Stubble rear tires as well as Edge front tires (both come in XTR compound).

Now, onto the differences that set the Sport apart from the B2.

RC10B2 SPORT

The B2 Sport has the same chassis, suspension arms, shock towers, steering assembly and transmission as the "full-race" B2. At a glance, the only obvious changes are the addition of a mechanical speed control and the Gold-anodized shocks; the other differences are not so noticeable.

The B2 Sport features Oilite bronze metal bushings throughout to help keep overall costs down. The car is equipped with a tried-and-true, mechanical, resistor-type speed control. The second servo is mounted next to the unit directly in the left side "pod." A Tamiya*-style and bullet-type connector are found at both ends of the speed control's wires for the motor and battery.

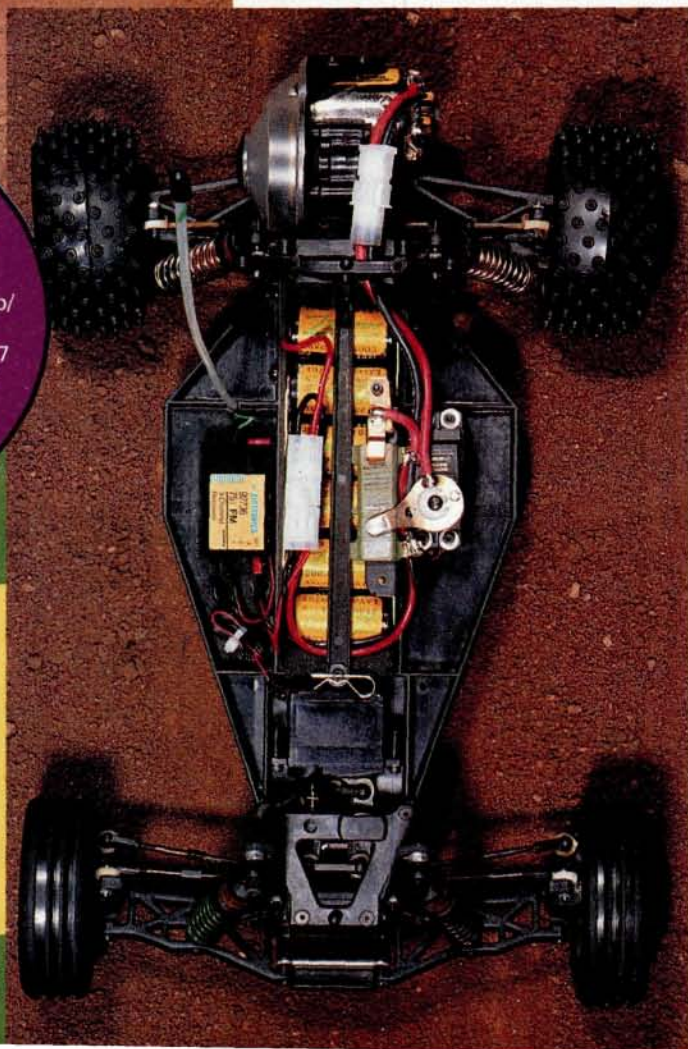


TEST EQUIPMENT

- Airtronics* CS2P transmitter
- Airtronics 92736 75MHz FM receiver
- Airtronics 94737 steering servo/ 94737 speed control servo
- Reedy* Nova Zapper Sanyo 27 amp 1700mAh SCRC battery pack
- Body by Scot Bich of Bich'n Bodies*

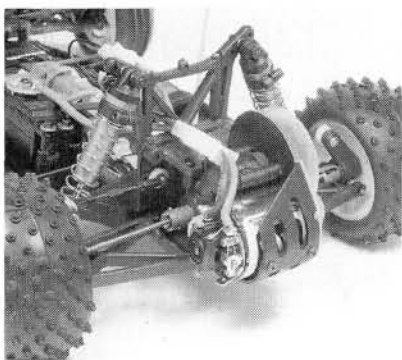
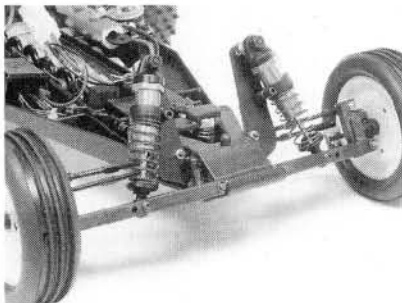
THINGS YOU'LL NEED

- 2-channel radio system (on proper "surface use" frequency).
- Two servos (one for steering and one for the mechanical speed control) with at least 30 oz./in. of torque.
- Six-cell battery pack.
- Battery charger.
- Basic hand tools, e.g., Phillips-head and flat-bladed screwdrivers, pliers, etc.
- Paint for Lexan body.

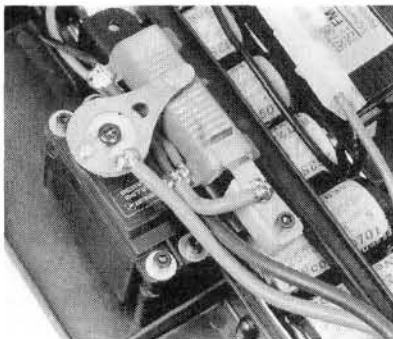


ASSOCIATED B2 SPORT

Gold-anodized shocks of the same length replace the hard-anodized Team Shocks. There is no noticeable difference in performance, but the Team Shocks will last longer. The springs remain the same—green on the front, silver on the rear.



Three-piece wheels both front and rear allow the user to replace tires without having to discard the wheel itself. Associated's TQ73 four-rib front tires and TQ23 step-pin rear tires come standard with the car. The tires are made exclusively for Team Associated by Pro-Line and are molded with Pro-Line's XTM compound. A drive shaft/dogbone assembly replaces the B2's universal-joint drive shafts.



Sitting atop the buggy is a new "sport" body that features a functional, side air scoop. This scoop helps to keep the mechanical speed control cool during operation. Included with the B2 Sport is a stock DS spec motor.

So now that you know the differences between the two, the real question is: how does the B2 Sport compare out on the track? Read on....

(Continued on page 70)

Building & Setup Tips

BUILDING TIPS

The B2 Sport that I received was an early production kit, and it came built from the factory. Like all of Team Associated's products, the parts are of the highest quality, and if you follow the instructions to the letter, you should have no problem.

SETUP TIPS

The following information is based on a conversation with Team Associated's top driver, Mark Pavidis. We talked about getting the most from the B2 Sport and about his impressions of the car. Here's what he had to say:

"The B2 Sport is our newest entry-level buggy, and it can make any first-timer a winner. The kit is affordable, yet it can be easily upgraded to our B2 racing specs.

"When building the B2 Sport, first, I would follow the instructions word for word. We have improved the instructions for the B2 to make it easier to assemble and understand. In the instructions, you'll find an optional setup [see below]. This setup is used by most of our team drivers and works very well at most tracks.

"The B2 Sport comes with a mechanical speed control that requires a second servo. This allows the average guy who doesn't want to spend a pocket-full of cash the ability to start racing right away. The only real maintenance you have to do to the speed control is to clean the surface of the resistor; this can be done with an eraser.

"So if you're looking to get started in an entry-level car that is easy to convert to a full-blown racer, check out the B2 Sport. I can remember when I got my first RC10. It, too, came with bushings and a mechanical speed control. That entry-level car got me hooked, and I haven't stopped since!"

OPTIONAL SETUP

Front Suspension

- 25-degree caster blocks
- Front ride height: arms level
- Camber: 2 degrees negative camber
- Toe: 1 degree toe-in

Front Shocks

- Oil: 35 weight
- Piston: no. 1
- Spring: Green
- Limiters
 - Inside—.060 in.
 - Outside—none

- Shock tower location: outside hole
- Arm location: inside hole

Rear Suspension

- Suspension mounts: 3 degrees
- Wheel hub: 0 degree
- Rear ride height: dogbones level
- Anti-squat: standard
- Camber: 2 degrees negative camber
- Wheel hub placement: spacers placed to the front

Rear Shocks

- Oil: 25 weight
- Piston: no. 1
- Spring: Silver
- Limiters
 - Inside—.030 in.
 - Outside—none
- Shock tower location: middle hole
- Arm location: outside hole

Miscellaneous

- Battery placement: toward the rear

- U-joint drive shafts—part no. 9275

- Hard-anodized front shock body—9310

- Hard-anodized rear shock body—6435

- Front one-piece wheels—9480

- Rear one-piece wheels—9490

- Front Pro-Line tires—6877

- Rear Pro-Line tires—6824

- Stealth transmission ball bearing set—6563

- Front and rear axle ball bearings required (four pair required)—6906

- Steering bellcrank ball bearings—9162

- B2 chassis, standard-length, molded carbon-fiber composite—9199

- B2 chassis, short, molded composite—9201

- B2 chassis, short, molded carbon-fiber composite—9202

- B2 battery hold-down strap, molded carbon-fiber composite—9229

- B2 transmission brace, molded carbon-fiber composite—9381

- B2 front arm, molded carbon-fiber composite—9106

- B2 front top plate, molded carbon-fiber composite—9131

- B2 front shock strut, graphite—9141

- B2 rear A-arms, molded carbon-fiber composite—9256

- Rear suspension mounts, 2 degrees toe-in per side—9266

- Rear shock strut, molded carbon-fiber composite—9271

- Shock downstop set (travel limiters)—6466

- B2 gear cover to fit Losi Hydra Drive/Schumacher Viscous Drive—9248

FACTORY OPTIONS



the Competition

	Team Losi Double-X Bushing Kit	Associated RC10B2 Sport
Wheelbase	10.625 in.	10.375 in.
Width (F/R)	9.625 in./9.875 in.	9.875 in./9.75 in.
Weight	3 lb., 10.5 oz.	3 lb., 9.3 oz.
Diff type	Racing Ball	Ball
Chassis	Stiffzell	Composite/aluminum
List price	\$239.95	\$250
Available at*	\$123.99*	\$130*
Reviewed in	11/95	3/97

*Prices vary with location

ASSOCIATED B2 SPORT

(Continued from page 67)

PERFORMANCE TEST

During the winter months here at the *Car Action* office, we turn our attention to off-road racing indoors. Primarily, we race at Long Island Raceway (the East Coast version of SoCal or the Ranch). When we go, there's usually a contest between me and George to see who can one-up the other, and this time was no different.

We decided to race both truck and buggy at this particular race. For the buggy class, I brought along a fully race-ready B2. The car is as "factory" as can be; it has all the hop-ups a racer could ever want. For comparison's sake, I had the B2 Sport with me. I remember thinking that I'd break out the Sport after the Mains were over to see how big a difference there was between it and the full-race B2.



Likes

- **Great value for your dollar.**
- **Can be upgraded as your skills progress and wallet allows. You can turn the Sport into the same car Matt Francis used to win the IFMAR world title in Japan.**
- **Complete package. The car works well out of the box; no modifications are necessary to hit the track.**
- **New, improved instructions.**



Dislikes

- **None comes to mind.**

When we got to the track, we surveyed the layout and condition of the surface. It was, by far, the bumpiest we had ever seen it. The entrance to the straightaway was all chewed up, few sections were holding a blue-groove and, in general, it looked as if the trucks would obviously fare better. I didn't have any packs charged, and I had to set up my truck, so I didn't really get to practice with the B2. I would have to practice and experiment with setups during the three qualifiers.

As expected, the trucks did, in fact, work better with this type of track condition, and I was completely "un-dialed" in buggy. It was no fault of the car, mind you; it had been set up for someone else's driving style, which was completely different from mine!

Also, I was running square-carcass-type fuzzies on the buggy, and while they enabled the car to hook up well and gave plenty of forward bite, anytime I hit a rut or pothole on the track, it would pitch the car and toss it all over. When I switched to a more rounded carcass tire, I was able to conquer the rough-and-tumble sections of the track more easily, but I was having all sorts of traction problems.

At this point, I was doing well in the truck class, so I decided to concentrate my efforts on the truck class and bail on my third 2WD qualifier. I had run what I thought were two miserable qualifiers in 2WD with the B2 and just couldn't get

hooked up. I also didn't have much with me in the way of parts for the buggy, so I thought why not just go for it with my truck and forget about the 2WD class altogether.

After the third qualifiers were over, I checked the board to see where I was sitting in truck. I happened to glance down at the 2WD Mains sheet, and I was astounded to find that even though I had skipped my third qualifier, I had done well enough in the first two to put me into the A-Main. I quickly remembered that I had pretty much packed up my buggy and didn't have any packs charged for the upcoming Main. "Why not run the B2 Sport?," someone snickered at me when I returned to my pit table and shared my dilemma with everyone. Comments ranged from "Here's something to dial your speed control in" (at which point, a pencil and eraser were thrown my way) to "You're not really running that, are you?" That's when I turned to them and said, "Not only am I going to run this car, but I'm also going to beat at least a few of you doing it!" After the "ooooohhhs" had settled down, I mentally started to prepare for the thorough thrashing that would come after coming off the drivers' stand.

I took the B2 Sport out of my carry bag and proceeded to check it out. That was the first time I found out that there wasn't any on/off switch. When I plugged the pack in, it skated across my pit area and almost took out George's Losi car. Everyone had another moment to joke around at my expense about how I wasn't going to be able to race the car since I couldn't even control it off the track! Now I was getting fired up.

I used some Trinity* Buggy Grip 2 on the rather large step-pin rear tires (at this point, I was thinking of trying anything to edge out my opponents), and I headed to the starting grid. I had qualified eighth (the chunkiest section of the track coincidentally happened to be right in front of my starting position) but, in my mind, I now felt as if I should be starting in the back row. I was afraid that I would be taken out on the start by the two guys behind me once the buzzer had gone off. My strategy was to pull to the side on the start, let everyone go past and try to get a good feel for the car's handling abilities and overall prowess on the track. What happened next was a real surprise.

When the buzzer sounded, I nailed the throttle, and to my amazement, the car launched off the line with authority! At the end of the straightaway, there was a small pileup, and I quickly moved into sixth overall. The car handled better than my race-ready B2! I couldn't believe what I was seeing. Everyone else was running wide-open, sick-wind 11, 12 and 13-turn doubles with killer battery packs hard-wired in place and top-of-the-line ESCs, and here I was plodding along and keeping up with them while using a basic stock motor (with a

plug-in connector, no less), a decent sport pack (with a Tamiya-type connector), a mechanical speed control and tires that were definitely not the choice of the day for sure! The car was so smooth I found myself thinking that if I had run this car in my first two qualifiers, I would have scored a much better starting position on the grid. The car jumped well, exhibited no signs of pushing, and it handled the rough sections of the track marvelously; it drove better than I could have anticipated.

Toward the end of the race, I noticed that I was still holding my ground. Only one person got past me, and I found myself in seventh place. And lucky me! One of the racers I was beating was my buddy George! Already bragging rights came to mind. As the buzzer sounded to finish the race, I was comfortably sitting in seventh overall. The G-Man pressured me a few times throughout the 4 minutes, but I've got nerves of steel, and I fended him off each time. (He claims he had radio problems and was glitching the whole time. Do you think he was too embarrassed to admit that I beat him using a car equipped with a mechanical speed control? You be the judge.)

The B2 Sport is an admirable performer. It was a worthy competitor and, even though I didn't verify this, I'm almost certain that my lap times were faster and more consistent with this car than with my race-ready B2. I was really surprised at how well the mechanical speed control worked. I handed my radio over to a few buddies after the race so they could try it, and when I commented, "Not too bad for a mechanical speed control," every one of them thought I was kidding; it's that smooth, folks. The included Ds Spec motor provided ample power, but I would like to try out a slightly hotter stock motor in the future. Tires that are better suited to the track condition would help considerably, too, but all in all, I was pleasantly surprised at how well the car performed in stock trim.

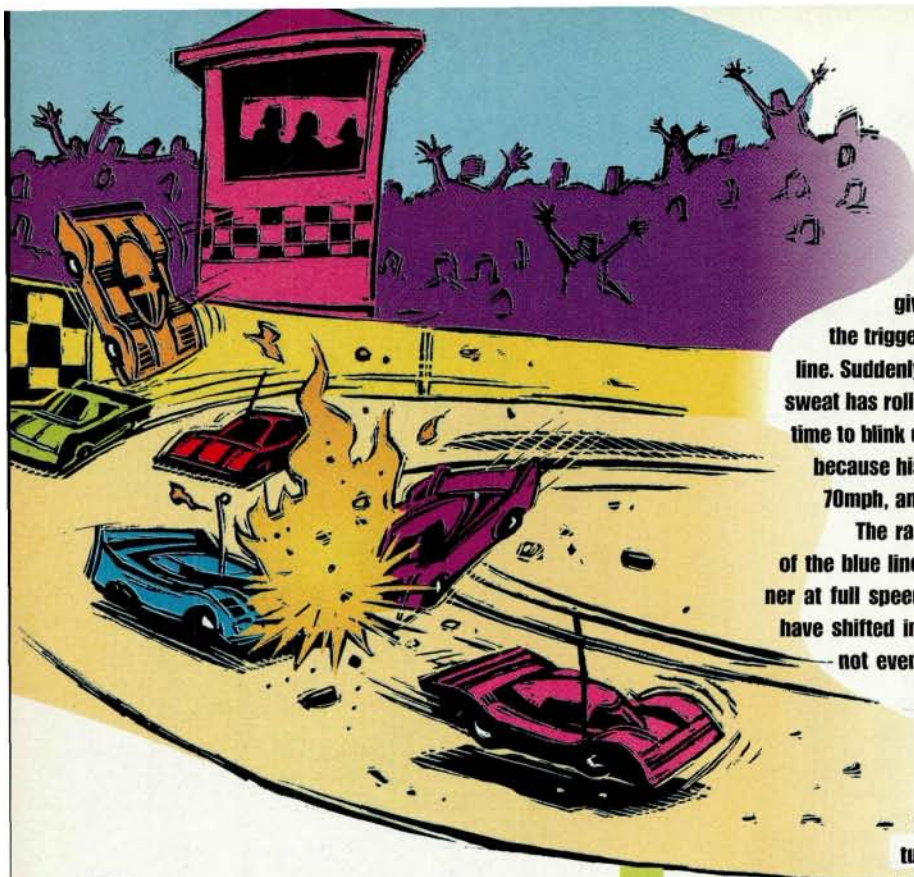
After the race, I walked back to the pits with the B2 Sport with my head held high.

CONCLUSION

I think Team Associated has a sure-fire winner on their hands. Most important, they've produced a car that entry-level racers can grow with as their skills progress. The Sport can be easily upgraded to full B2 specs, but it's also a complete racer right out of the box, and it needs no mods to tear up the track right away (a fact that was proven to me while racing it in stock form). Basically, it does everything the full-blown B2 does at a much lower price.

If you're interested in joining the off-road craze and you don't want to spend an arm and a leg to get into it, check out the B2 Sport; it's a great car.

*Addresses are listed alphabetically in the Index of Manufacturers on page 184. ■



HUNDREDS OF spectators circle the enormous perimeter of the Olympic Velodrome as a lone racer sets his car on the starting grid. Suddenly, an eerie silence overcomes the facility as the racer approaches the drivers' stand and waits in anticipation for that all-systems-go designation from the race director. The signal is given and, without any hesitation, the racer yanks on the trigger, and the car literally explodes from the starting line. Suddenly, the racer's eye starts to sting because a drop of sweat has rolled down his forehead and entered his right eye. No time to blink or even wipe the sweat from his brow, though, because his car is rapidly approaching turn number one at 70mph, and the race will be over in a few short seconds.

The racer manages to keep his car low and on the inside of the blue line as it circles the enormous two-story, banked corner at full speed. As the car exits turn number two, it appears to have shifted into warp drive because it is reduced to a blur that not even the fastest camera lens could possibly focus on. Within 3 seconds, the car is pushing the 100mph barrier, and the aerodynamic attributes of the car's body can be seen and heard. At this point, the racer is faced with a decision that has to be made in a split second: should he slow down for turn number three or trust the laws of gravity and hit the corner with all the forces of the gods above?

(Continued on page 76)

Insanity Reigns

An inside look at the World's Fastest Cars

by George M. Gonzalez

CLIFF LETT'S

Associated RC10LSO

AVERAGE SPEED

87.29

MILES PER HOUR

This car is the current record holder as well as the car to beat at the next Insane Speed Race competition. Many will argue that this car boasts a very basic design, but I guess you can't argue with its success. Cliff believes that it was his rather smart selection of batteries that allowed him to set the new Insane Speed Race record.

Chassis & Motor Pad

Cliff's Associated* RC10LSO has been highly modified to withstand the incredible G-forces that a 100mph run can dish out. A special chassis was designed to accommodate two 600mAh cells mounted end to end on each battery slot (more on the batteries later). The rear pod is basically the same pod that's used on Associated's new RC10LSC, except Cliff added an upper cross brace with a special body-mount post. The body-mount posts are not used for body



mounting; however, the posts have 1/8-inch ceramic balls attached to their tops, and the balls make contact, or rub against Teflon™ tape that has been applied to the inside of the body. In theory, this design helps prevent the body from pushing down on the chassis during extreme downforce conditions which, in turn, prevents the chassis from bottoming out.

JOHN PETERSON'S Insane Speed Race Car

AVERAGE SPEED

85.23

MILES PER HOUR

John's car was the only one that did not use an Aveox brushless motor system. Instead, John opted to use a Twister* 10-turn drag motor and only 18 cells (only 18 cells—what's wrong with that statement?). In addition, John was one of the few racers to fund his own car. In other words, John is self-sponsored—a rarity in this class of racing.

Chassis & Motor Pad

John used a custom-made graphite chassis plate. The rear pod is from Superior Racing Products as are the aluminum axle, diff and hubs.

Suspension

The front suspension is as basic as you can get. An Associated standard (non-adjustable) RC10L suspension is used. In fact, the rear T-plate suspension is also very basic and is no different from any other Associated RC10L you would find racing on the on-road circuit. A standard Team shock with Gold Spring smoothes out the bumps.

Motor and Batteries

John's car is one of the few to run a conventional 05 brush-type motor. Even though this motor uses brushes, it's far from conventional. It's a special 10-turn Twister Air Force drag motor that is designed for all-out drag racing. When combined with 18 specially matched 1000mAh batteries from Ballistic Batteries*, this motor packs one hell of a wallop! A Novak 828-HV ESC does a fine job of taming the ponies.

Tires

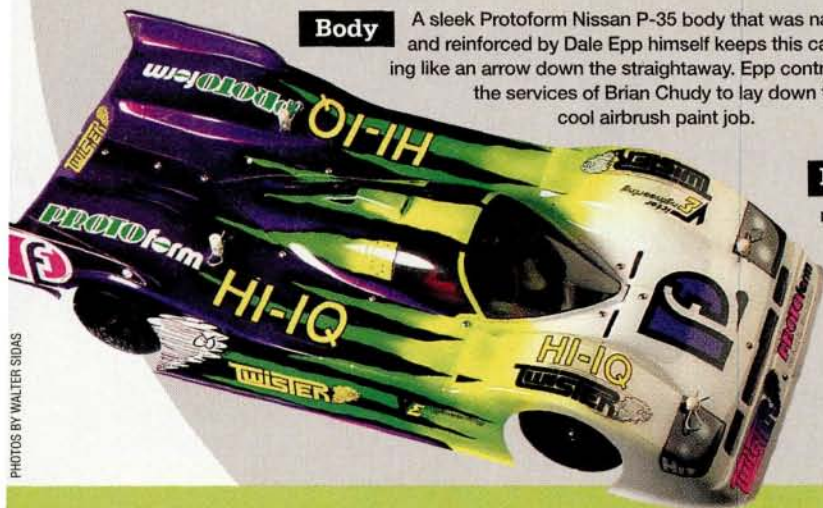
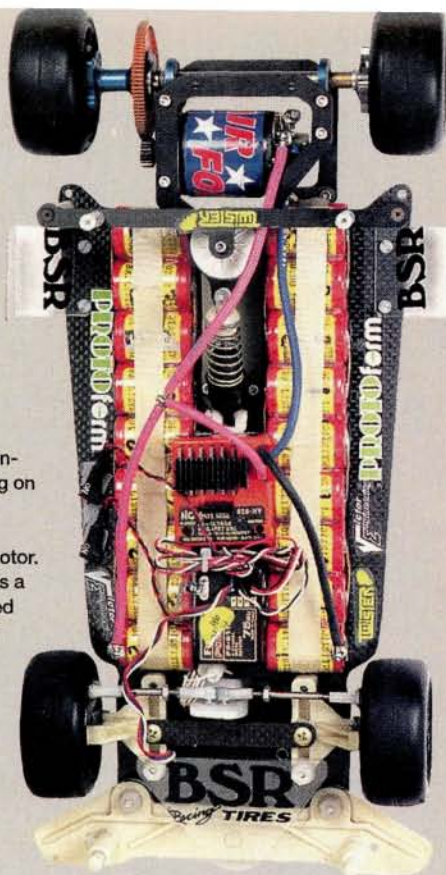
Gee, I wonder which tires he used. Could it be he used BSR tires as well? Yup! OK, John outfitted his car with BSR Gold Net tires on all four corners.

Body

A sleek Protoform Nissan P-35 body that was narrowed and reinforced by Dale Epp himself keeps this car tracking like an arrow down the straightaway. Epp contracted the services of Brian Chudy to lay down the cool airbrush paint job.

Radio

John uses his Futaba 3PJ PCM transmitter and FP-R113iP receiver to control his car. An Airtronics 94141 servo keeps his tires pointed in the right direction.



PHOTOS BY WALTER SIDAS

Suspension

The front suspension kingpins have been replaced by longer RC10B2 inner hinge pins. The longer kingpins allow an additional plastic washer and rubber O-ring to be placed along with .022 springs. A dab of RCPS* Green Slime is applied to the front springs and O-rings to provide additional damping. Each wheel receives 6 degrees of caster. The rear shock is set up with 60WT silicone shock fluid, an RC500 shock spring and an RCPS shock-bladder kit.

Motor & Batteries

Cliff uses an Aveox* brushless motor system that can handle up to 32 cells. These motors require an Aveox speed control; therefore, one is included with every motor. These motors run cool, and they have no commutators or brushes to become worn and need replacing. In addition, the motors always run the same—fast, very fast!

Cliff mounted two Reedy* Zappers 600mAh batteries in each slot of the chassis (26 cells total). He chose the smaller 600mAh batteries over the more common 1000mAh cells for various reasons. First, the cells can be mounted flat on the chassis instead of on top of each other; this drastically lowers the car's center of gravity (CG). Second, the 600mAh cells weigh a whopping 3/4 pound less than the same number of 1000mAh cells—wow! Finally, there isn't a tire manufactured (yet!) that can handle one lap where the car averages

more than 90mph. For this reason, the added capacity and punch of the 1000mAh cells are basically overkill.

Tires

Cliff installed Silver compound BSR* capped tires (designed to run on the left of an oval car) up front and Silver capped tires (for the right of the car) in the rear. These tires did work well, but they were tossed into the trash directly after Cliff had completed one lap and set the new Insane Speed Race record.

Body

Cliff used a Protoform* Nissan GTP body (part no. 1402N) and narrowed it down by 1/2 inch. The body is made of extra-thick material and is reinforced to make it stiffer. In addition, the body is mounted in six different locations and is supported in the rear by the rear-pod upper-crossbrace posts.

Radio

Cliff used his Airtronics* Caliber 3Ps and 94737 high-speed servo. Because of its lightweight nature, he used a Futaba* FM receiver instead of the stock Airtronics unit. To keep the car relatively glitch-free, a 5-cell, 50mAh receiver pack was installed on the chassis. In addition, Cliff replaced the antenna with a .030-inch-thick piece of music wire to cut down on drag. Hey, every little bit counts!

INSANITY REIGNS

(Continued from page 74)

The racer decides on the latter of the two choices and proceeds to attack the corner at full speed. Unfortunately, as the car approaches the corner, a loud pop is heard, and the echo carries the devastating sound to an unsuspecting population miles away. Pieces of rubber-capped tires are ejected from the rear wheels that were once rotating at a mind-boggling 100,000rpm. The racer frantically tries to control his car and steer it to the safety of the grassy infield but, instead, the car is launched into a steel guardrail and disintegrates to the amazement of the spectators.

The agony of defeat sets in as the racer rummages through the aftermath only to confirm what he already knows: nothing salvageable here! This is the price of admission, folks, if you want to compete in the Insane Speed Race. To earn the title of world's fastest, you have to take chances, and sometimes sacrifices have to be made. Although the Insane Speed Race isn't

for everyone, you have to admit that it sounds pretty exciting. For that reason, we decided to give you an inside look at some of the fastest R/C cars in the world and give you the behind-the-scenes look at this very special event and the racers who pilot these nuclear-powered land missiles; so put on your helmet and fasten your safety belt 'cause we're going for a ride on the insane side.

INSANE RULES

The rules for the Insane Speed Race are very simple. It's the driving part that requires lightning-fast reflexes and nerves of steel. The cars are run one at a time and must complete at least one verifiable lap by the automated lap-counting system. The drivers typically begin their run at turn two, and the cars typically run three laps. The first lap is usually for warming up the capped tires to achieve maximum adhesion. The money lap (the lap that counts) could

(Continued on page 79)

KENT CLAUSEN'S HPI Streamline

AVERAGE SPEED

**90+
EST.**

UNCONFIRMED

Is this thing cool or what? Kent Clausen from HPI* designed this open-wheel land missile to

break the sound barrier. Unfortunately, reports conclude that it wasn't the most successful car at the last NOR-RCA Winterfest. It's an interesting concept, but like Shawn Ireland's Monocoque car, more testing and tweaking is needed before it can be considered a formidable racecar. It seems that the most successful Insane Speed Race cars have been the ones with the most conventional designs.



SHAWN IRELAND'S

Composite Monocoque

AVERAGE SPEED

???

UNCONFIRMED

This is one of the most high-tech-looking R/C cars around. The car was designed by Robert Bartlett and Craig Stafford. These guys used to work at Nissan's GTP racecar facility. Robert was in charge of designing and manufacturing the wings that were used on the championship-winning Nissan GTP racecar, and Craig was in charge of wind-tunnel testing. Together they worked to design this rather exotic creation you see before you.

Unfortunately, this car is still in the testing stages, so no official speeds could be quoted here. I have heard, however, that this car turns into a kite and gets airborne once it's introduced to a certain speed. More testing and dialing-in needs to be performed on this car before it becomes a formidable Insane Speed Race car.

Chassis & Motor Pad

As you can see by the photos, the chassis is made of carbon fiber and has undergone a special molding process to form the desired shape. The batteries and electronics are actually mounted inside the chassis (between the upper and lower chassis pieces), which does make access a bit difficult, but the aerodynamic attributes outweigh any inconveniences that are caused by the rather unconventional battery-mounting system. Lexan trap doors on



each side of the chassis provide just enough room to access the batteries and the other electrical components.

The underside of the chassis is equally impressive. Special ground effects, splitters and air diffusers are molded into the underside of the chassis and are designed to manipulate the airflow under the chassis. This is full-scale racing stuff, folks!

Suspension

An HPI Road Star adjustable front suspension provides the perfect geometry for high-speed running. The motor pod is also borrowed from the Road Star and pivots on pillow balls instead of a more conventional T-plate. Shawn rigged up two smaller Delta shocks to aid in the side-to-side damping, and these shocks work in conjunction with the springs that are mounted on each side of the custom-made motor pod.

Motor & Batteries

As you can see, this chassis is naked! An Aveox brushless motor system and 26 Orion V-Max 1000mAh cells are usually mounted on the chassis.

Tires

BSR strikes again. This car uses a special prototype tire that was designed for high-speed applications. The capped tires have a hard-foam core, super-stiff wheels and a special fiberglass net or belt molded into the rubber to eliminate tire expansion. Do they work? This remains to be seen. We'll let you know after the next Insane Speed Race.

Body

The body that is usually mounted on this car was pulled off a mold that was made by Craig Stafford. It was based on a working 1/6-scale prototype that he was testing while employed with the Nissan Racing Team. Unfortunately, the body was destroyed during one of the test runs, so we can't show it to you. I think that you'll agree, though; this car looks fast even without the body installed.





Chassis & Motor Pad

This car is the narrowest of the group. A special graphite chassis was designed by Kent, then the plans were sent to DA Graphite* for final finishing. Even though there is very little room for mounting electronics on this chassis, it has the most organized wiring of the bunch. The Streamliner also has the longest wheelbase of all the Insane Speed Race cars we've seen but, again, the design is still being perfected, and no one could say for sure whether or not the extra-long wheelbase is an advantage.

Suspension

This car also uses a front and rear suspension that is similar to the company's Super F1 and Road Star vehicles. In fact, the suspension is very basic for such an exotic-looking car.

Motor & Batteries

The Aveox 1409 2Y brushless motor system gets the credit here, too. What more can I tell you about this awesome system? Twenty Sanyo 1000mAh cells are mounted flat on the chassis plate, and a graphite

battery hold-down system is used to secure the cells.

Tires

BSR tires seem to be the tire of choice. This car uses super-narrow, Silver compound fronts and standard-width, Gold-compound rears.

Body

A much narrowed-down Protoform Isdera body makes this car look like a freight train from hell. Kent decided to go for that open-wheel look, which is kind of odd. I would think that having the wheels stick out in the open would create a great deal of unnecessary drag, but Kent informed me that because of tire expansion at such high speeds, body rubbing was an issue.

Radio

A Futaba 1024 transmitter with a FP-R103F FM 3-channel receiver is used. A Futaba FP-S132H high-speed microservo keeps the car on track and is powered by a Novak 50mAh 5-cell receiver pack.



SHAWN IRELAND'S

HPI Insane Speed Chassis

AVERAGE SPEED

**110+
EST.**

UNCONFIRMED

This is the car that everyone was talking about. Everyone who attended the NORRCA Winterfest agrees that this car was, by far, the fastest at the event. In fact, it was so fast that it made Cliff Lett's amazing 87mph run seem slow! The only problem was that

the car just could not complete a verifiable lap without blowing a tire or melting a spur gear. "It was way too fast," commented one racer. There was no doubt in anyone's mind that this car shattered the 100mph barrier; however, it never crossed the finish line.

Chassis & Motor Pad

If the chassis looks familiar, that's because it's a narrowed-down version of HPI's "Insane Speed Run" conversion kit that was offered a few years back. The chassis features reinforcing side rails that are designed to keep the chassis as stiff and flex-free as possible. The chassis also features a slightly longer wheelbase than the original chassis, and that has been proven to make the car much more stable at high speeds.

Suspension

Up front, you'll find an HPI adjustable suspension like the ones used on the company's Road Star vehicles. The only modification Shawn made was the installation of stiffer springs that help support the extra weight of all the batteries. Out back, you'll find an HPI shock equipped with a stiff blue spring and 60WT oil. Shawn made a custom shelf just above the rear shock to house the Aveox speed control.

Motor & Batteries

Again the famous Aveox brushless motor was used. Shawn uses the model 1409 2-turn motor just like everyone else. Twenty six Team Orion* V-Max 1000mAh batteries power Shawn's ride. According to Shawn, the 26 V-Max cells put out the

same voltage as 29 unmatched 1000mAh cells, and all the fast guys use them.

Tires

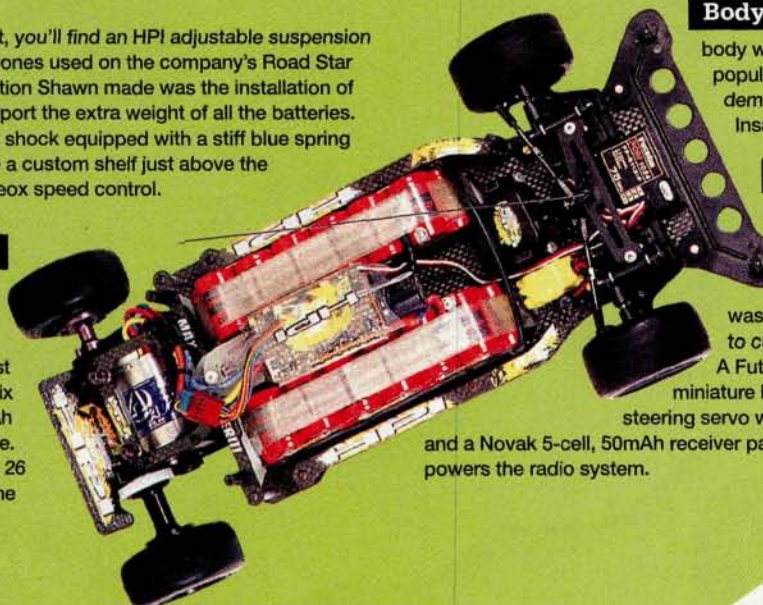
BSR Feather Lite Pro tires are found on all four corners of Shawn's car. He used Silver compound (L) up front and Gold compound (R) in the rear.

Body

An unmodified, narrow Associated Jaguar GTP body was used. This is still the most popular body among speed demons. It's actually designed for Insane Speed Race cars.

Radio

Shawn used a Futaba 1024 PCM transmitter with a FP-R113iP micro receiver. A thin strand of piano wire was used as an antenna to cut down on drag. A Futaba S-3002 miniature high-speed steering servo was used, and a Novak 5-cell, 50mAh receiver pack powers the radio system.



INSANITY REIGNS

(Continued from page 76)

either be on the second or third pass. In most cases, it's the second lap that counts, but I've seen racers chalk up their best lap times on the third lap and some even on the first lap; it doesn't matter.

Unfortunately, some of the past Insane Speed Race competitions have been plagued with inconsistencies, or contradictions, in the way lap times have been recorded. This prevents us with crediting a particular driver with the title of world's fastest. Here's an example of these inconsistencies: Team Associated driver Cliff Lett recorded an 87.29mph average speed at the '96 NORRCA Winterfest to set an Insane Speed Race speed record. However, back at the '93 Thunderdrome, HPI driver Joe McGregor posted an 87.41mph average speed which, on the surface, appears to be faster than Lett's new record.

So why was Cliff Lett's speed considered to be faster? Because of lap times, that's why. Lett's car was posting lap times that were nearly a full second faster than McGregor's best lap times, which meant that Lett's car was traveling at much higher speeds. Steps have been taken to ensure that subsequent Insane Speed Race competitions follow strict track-measuring methods so that accurate lap times and average speeds can be attained. For the time being, Cliff Lett's 87.29mph average speed will be used as a benchmark for the next Insane Speed Race competition.

THE FIRST SIGNS OF INSANITY

The Olympic Velodrome, which is adjacent to the California State University Rancho Dominguez campus, was the site of the world-famous R/C Thunderdrome Race that was held for four years from 1990 to 1993. Dan Moynihan from Dan's R/C* and Gary McAllister from McAllister Racing should receive mention for organizing this mega-superspeedway event. Although the Thunderdrome was well-known for its 200-lap, 45-minute Superspeedway Enduro Race and its circus-like atmosphere with dozens of manufacturer booths, it was a small exhibition race that brought the Thunderdrome its worldwide status. The small exhibition race that I'm referring to was the Insane Speed Run.

Today, NORRCA sanctions an annual event at the Olympic Velodrome called the NORRCA Winterfest, and a 200-lap superspeedway race and the Insane Speed Race, as it is now called, are still part of the venue. At this event, however, the Insane Speed Race draws the most spectators. And why shouldn't it; where else could you see R/C cars circle a huge 330-foot banked oval at speeds that average 87mph. I must emphasize the words "average speed" because to achieve an average speed of 87mph, these Insane Speed cars must travel down the straightaways at speeds approaching 100mph.

INSANE MAINTENANCE

You know that tires are the single largest expense in this event. How about the motor and drive train? When the Insane Speed Run was first introduced, very few electronic speed controls (ESCs) could handle 20 or more cells. The Novak* 828 and Tekin* 420 G2 were among the most popular. Even though these high-power ESCs were designed to meet the high-voltage demands of these elite racers, they usually failed because of over-gearing and extreme heat. Racers were tossing speed controls after every other run—very expensive.

Most of the cars in this article used an Aveox brushless motor system, which consists of a special 2-turn brushless motor and a dedicated computer-controlled ESC. This system could easily handle the power that the Insane Speed Race cars demand, and they produce more than twice the power of conventional brush-type motors. The Aveox motors are also pretty much maintenance free because they have no brushes or comms to replace. The Aveox brushless motor system is the system of choice in the Insane Speed Race competition.

Another high-maintenance area on Insane Speed Race cars is the differential. When talking to Shawn Ireland from HPI Racing, I found out that the diff on his car had to be completely rebuilt after every run. Apparently, the diff balls got so hot that they melted the spur gear in less than 6 seconds. This is not a result of running a loose diff setting; it's the result of the extreme heat that's caused by the diff action as the car corners! In addition, the diff rings developed large grooves, which meant they had to be replaced. I heard reports that in one of the runs, Cliff Lett's car came to a dramatic stop after a diff ball had melted through his car's spur gear and got lodged in the pinion gear—talk about being stopped dead in your tracks.

What about when one of these cars crashes? In most cases, the drivers have been able to regain control and steer to safety even after blowing a tire; however, I've seen a couple of these cars hit a guardrail at some pretty hair-raising speeds. Not a pretty picture! Nuclear meltdowns are also common at Insane Speed Race competitions. This condition isn't as dramatic as watching a car explode, but it's equally devastating to the car. Meltdowns are caused by extreme heat, and the result is usually a short in the wires caused by melted wire insulation. Once the wire's insulation has melted away, the exposed wire makes contact with a conductive area of the car's chassis and—poof!—instant fire.

So, are all these risks and all this maintenance worth it? Some will say they are, while others will say they aren't. You must admit, though, the title of world's fastest R/C racer has a nice ring to it.

**Addresses are listed alphabetically in the Index of Manufacturers on page 184.*

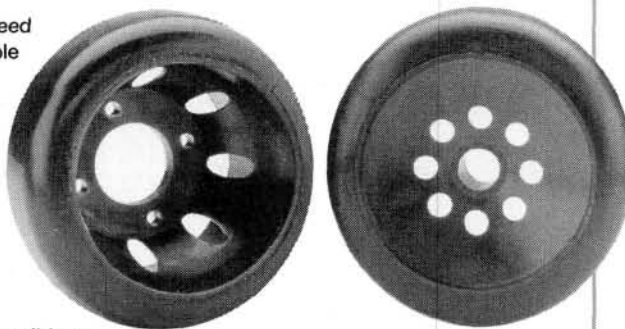
The Tire Dilemma

Most of the Insane Speed Race cars are capable of reaching speeds that exceed the capped tires' maximum rpm. What this means is that today's R/C car chassis and motor technology have surpassed high-speed, capped-tire technology by leaps and bounds. According to the experts, it is currently impossible to

exceed the 87mph average speed mark without blowing up a perfectly good set of capped tires. Team Associated's chief engineer and factory driver Cliff Lett confirmed this theory at the last NORRCA Winterfest by repeatedly blowing up tires until he finally completed one successful lap. If you're wondering, yes, capped tires are very expensive. Many racers agreed that Cliff did not have the fastest car at the NORRCA Winterfest. He did, however, have the most successful one.

The car that everyone was talking about is owned by Shawn Ireland from HPI Racing. I was told by everyone involved that Shawn's car blew down the straightaway at speeds of over 100mph and made all the other Insane Speed Race cars seem slow! The only problem was—yeah—those pesky tires turned into grenades on the back straightaway.

Well, the next Insane Speed Race should be very interesting because a number of drivers are actually making their own tires. In addition, the folks at Jaco* and BSR are experimenting with some new tires that were designed specifically for this event. According to Cliff Lett, the 100mph average speed barrier will be shattered next time around, and he hopes that he will be the man to do it.



HOME PROJECT BUILT

by Dave Sproul

MY ALL-TIME FAVORITE exhibition drag cars are the awesome, jet-powered funny cars that regularly appear across the country at NHRA and IHRA drag strips. These flaming missiles of the quarter-mile put on a fantastic starting-line show with massive clouds of smoke and earsplitting "burner pops" as they inch their way to the starting line just prior to a 6-second pass at nearly 300mph! Although their piston-engine-driven cousins may be faster at 5 seconds and 312mph, the sound of two jet funny cars cannot be matched. Envision for a moment sitting within

50 feet of a runway at Edwards Air Force Base while a pair of F-16s take off in front of you in full afterburner. That's the sensation! Absolutely incredible!

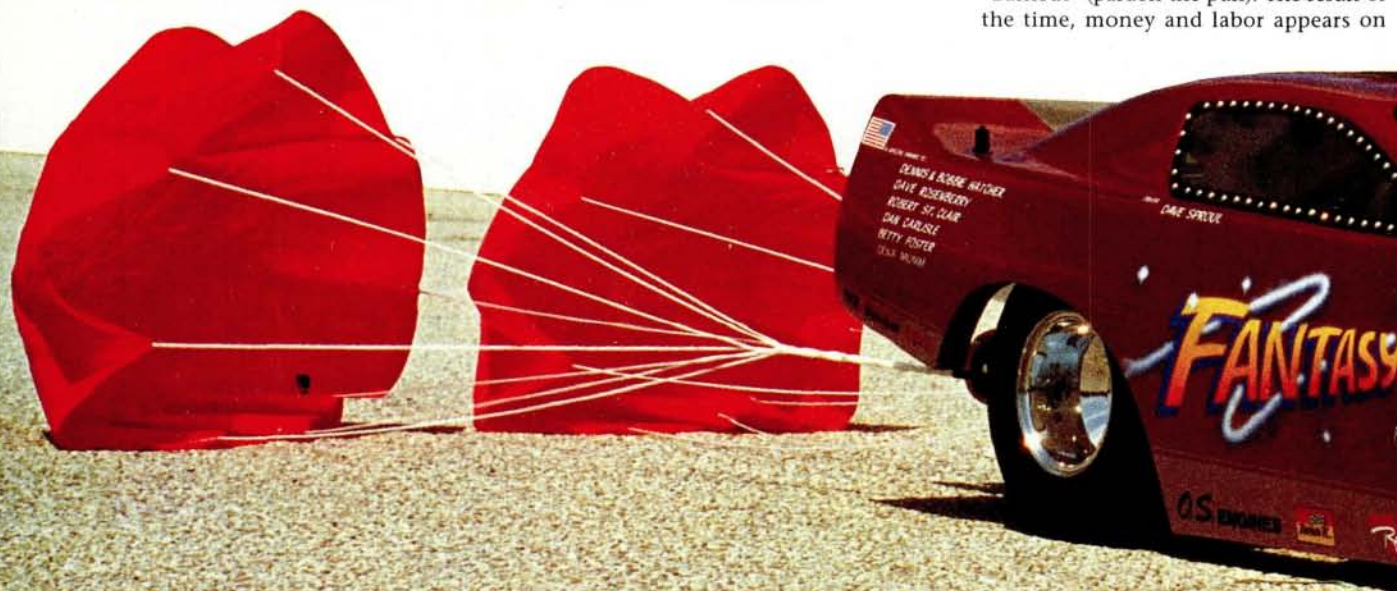


PHOTOS BY DAVE SPROUL



A front view of the fan unit and fuel tanks.

One of my dreams in life has been to strap myself into one of those fiberglass-body vacuum cleaners and see what 300mph with a screaming turbine next to me feels like. I imagine it is quite a rush, but my budget will not permit a couple of hundred grand to build one, so my dream (fantasy if you will—hence the name) had to be fulfilled on a slightly smaller scale. So with a lot less cash, a lot of time and tremendous support from some sponsors, I embarked on what turned out to be a long journey to create a 1/4-scale jet funny car. The project actually began about five years ago but was stalled many times by other projects, commitments and even some periods of loss of interest or "burnout" (pardon the pun). The result of the time, money and labor appears on



Nuclear Power



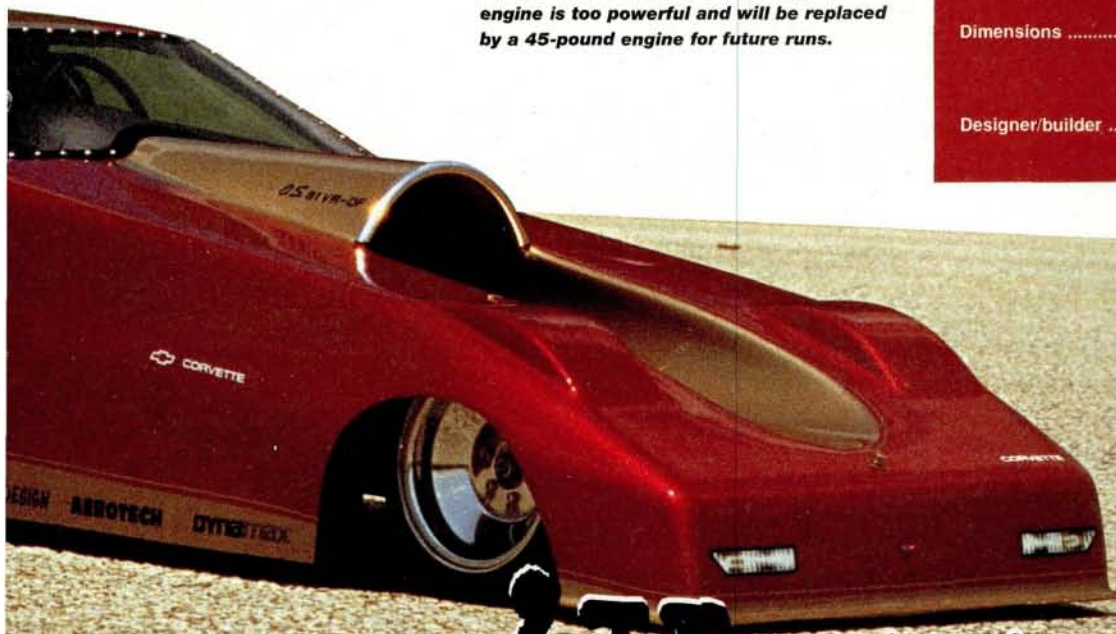
The Fantasy jet car with its body raised to show the world its fascinating drive train.

these pages, but the car is still not really finished, as I will discuss later.

The goals of this project were three-fold: 1. Create a 1/4-scale R/C car like no other. 2. Establish a 1/4-scale world land-speed record (goal 100-plus mph) 3. Break any existing world record for R/C cars of any scale. So far, I have accomplished number one, but two and three have so far eluded the project. I have not given up, however, as there are still a few "bugs" to work out before the car will be ready for a record-setting run.



The business end of the chassis shows the ducted-fan tailpipe and large Aerotech engine. With 155 pounds of thrust, this engine is too powerful and will be replaced by a 45-pound engine for future runs.



With its parachutes deployed, the Fantasy jet car makes a rather convincing scale replica. From the sounds of it, the speeds that this car could attain are far from scale—that is, unless full-size jet-powered funny cars can reach 1,000mph!

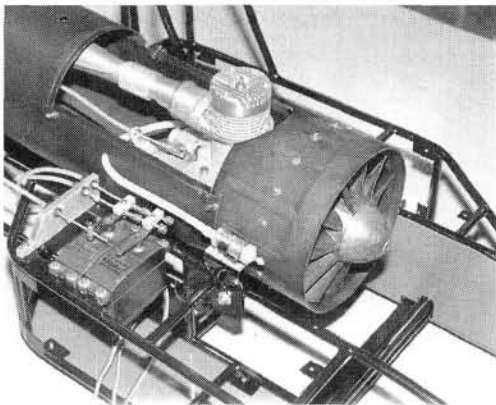
specifications

Chassis.....	Welded 5/16-inch chromoly tubing, custom design.
Body	1/4-scale fiberglass Corvette funny car, modified, custom paint.
Paint	GM Maroon Metallic, Porsche Gold Metallic.
Main power	O.S. Engines .91 VR-DF/Jet Model Products Dynamax ducted fan.
Supplemental power	Three 18-pound thrust Aerotech composite solid-fuel rocket engines. Updated to two 18-pound rockets and one 45-pound rocket. Total available thrust: 91 pounds.
Fuel.....	Morgan Omega 10-percent-nitro.
Brakes	New Era Models quad disk, rear axle only.
Wheels	New Era Models aluminum, polished.
Tires	Front—New Era Models funny car; rear—Twinn-K custom.
Radio system.....	Futaba FG Series 4-channel, modified.
Dimensions	Length—53.5 inches, width—16.5 inches, height—12 inches, weight—28 pounds.
Designer/builder	Dave Sproul, Mahomet, IL.

erred Vette

Fantasy Jet Drag Car

HOMEUILT: FANTASY JET DRAG CAR



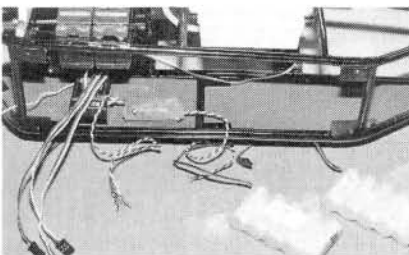
An O.S. 91 VR-DF engine spins a Jet Model Products Dynamax ducted fan rated at 10 pounds static thrust with a tailpipe air velocity of 180mph.

FANTASY FRAMEWORK

To tackle such a challenge, I needed a strong but light chassis, so I chose $\frac{5}{16}$ -inch chromoly tubing. I custom-designed and built the chassis. After I had welded it together, I painted it with Formula-U black polyurethane paint. I scratch-built the front axle and steering knuckles using aluminum and steel. The axle is split to allow individual left and right caster angle adjustments if required. The rear axle is $\frac{1}{2}$ -inch steel running in ball bearings with no suspension. The front wheels, tires and hubs are standard New Era Models* funny car units. I made the rear wheels using one half of a New Era rear wheel and one half of a front wheel to create a 3-inch-wide wheel, necessitated by the width of the ducted-fan unit. Twinn-K* custom-cut the tires. I polished all the wheels for a little extra sparkle. The brake system comprises dual New Era disk brakes on each rear wheel actuated by a $\frac{1}{4}$ -scale servo via flexible cables.

THRUST OR BUST!

The main power unit is a Jet Model Products* Dynamax ducted-fan system—the type normally used in ducted-fan-jet model aircraft. An O.S.* .91 VR-DF engine equipped with a Jet Model Products tuned pipe spins the fan at 22,000rpm. The combination produces 10 pounds of static



One $\frac{1}{4}$ -scale servo is used for throttle and brake, the other for brake lock. The 4-channel receiver is backed up by a RAM Servo Setter fail-safe unit. Dual battery packs are used for rocket-engine ignition.

thrust with a tailpipe air velocity of 180mph. In a 13-pound airplane, this combination is capable of speed around 200mph! But the car weighs in at 28 pounds and is much less aerodynamic, so supplemental power was necessary to help get it up to speed. To accomplish this, I added three 18-pound-thrust Aerotech* composite reloadable solid fuel rocket engines with a burn time of 2 seconds. The ducted fan and rocket engine combination provides a total of up to 64 pounds of thrust.

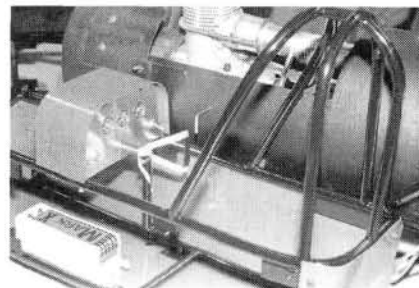
CONTROLLING THE EXPLOSION

I modified and retuned a Futaba* FG series 4-channel aircraft radio system for 75MHz and customized it with a steering-wheel control from an old Futaba Magnum Sport. The receiver is a standard 4-channel Futaba unit. I added a RAM* Servo Setter fail-safe circuit as a safety feature to be ready in case of radio failure. The radio system is powered by two DuraTrax* 1,000mAh battery packs wired in parallel and operated by the two dash switches. Futaba $\frac{1}{4}$ -scale servos handle the steering, brakes and throttle. A fourth Futaba S148 servo activates the ignition for the lower rocket engine on one side and deploys the twin 20-inch parachutes on the other. Two custom switches on the transmitter control this servo.

The rocket engine ignition system is entirely onboard and is powered by two 6V batteries wired in series to produce the required 12 volts. A switch at the end of the throttle servo travel activates the top two engines simultaneously. As previously mentioned, the ignition/parachute servo ignites the lower engine. I used heavy-gauge silicone wiring along with Sermos* connectors to handle the igniter's 30A current draw. I used custom removable brackets to mount the rocket engines on the frame.

FLAMING FINISH

As with most of my projects, I was not only interested in performance and function but also in scale appearance. I designed a custom cockpit complete with roll cage, seat, dash, instruments, switches and a "butterfly" steering wheel. To top off the chassis, I modified a scale fiberglass Corvette funny-car body for air intake, and I molded bulges over the front wheels to allow the body to sit as low as possible. Once I had finished the body mods, I shot the body with GM Maroon Metallic and Porsche Gold Metallic paint. Then I added custom airbrushed graphics and applied custom-cut vinyl sponsor

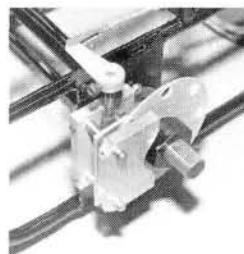


The author added a scale cockpit with a steering wheel and instruments for a touch of realism.

logos and finally covered the body with a clear top coat. To add a final touch in the looks department, I fabricated an aluminum tail cone and fitted it over the fiberglass ducted-fan tail unit.

GOING FOR THE RECORD

After the long building time and numerous delays, I finally started testing last summer. During a few parking lot runs, I checked the steering, brakes, engine, etc. Further tests followed at R/C Aviation Country Club in Hebron, OH, on their very smooth 3,000-foot runway. This was where disaster



New Era $\frac{1}{4}$ -scale brakes are used on the solid rear axle. Brakes have since been updated to dual disks on both sides.

first struck. During one of the initial runs, with the body off, the car found one of the few dips in the pavement, and this momentarily lifted the left rear tire off the ground. This, coupled with a stiff 17mph crosswind, was enough to make the car slide sideways, hook a tire after the resulting driver over-correction and end up in a spectacular barrel roll. Since there was no body to protect the chassis, there was quite a lot of damage, including a bent rear frame, rear wheels and front axle. It looked hope-

less, but after two hours of hammering, the chassis was back in shape and testing continued. The rest of the weekend was uneventful, and I ironed out a number of new car bugs.

A month later, I returned to Hebron for an additional day of testing prior to exhibition runs the following day at an airplane fun fly. Since this would be Fantasy's first public appearance, the pressure was on. It was during the first full test run with the rocket engines lit that disaster struck for the second time. The run was very straight and controlled until the engines flamed out; then the car suddenly got sideways, rolled onto its roof, slid about 40 feet on the pavement, flipped into the grass and slowly came to rest right-side up. Needless to say, the beautiful paint job was not quite the same! The run was awesome, but the ending was a little upsetting—literally!

(Continued on page 170)

Hop-Up Your Radio

Give that “low-end” radio “high-end” features by Peter Vieira



THINGS YOU'LL NEED

RADIO REMINDER

How many times have you grabbed your transmitter on the way to a day of fun, only to discover that the “on” button had been clicked and your batteries had been sucked dry? It’s frustrating! After this happened to me one too

many times (twice), I decided to install an LED that would glow whenever the radio was on. That way, when it was “lights out” for the night, I’d be sure to spot the “moron signal” and switch off my transmitter. Here’s how to do it.

TAKE A WALK around the pits at any R/C race, and you’ll see hop-ups on every car. These range from the use of a few anodized screws (practically the only mod you’re allowed in some spec classes) to wild, “everything aftermarket except for the E-clips” creations that boggle the mind and empty the wallet. But I’m willing to bet you won’t see hop-ups on the radios that control those carefully modified cars. For comfort, maybe there’s a bit of grip tape on the handle or fuel tubing on the trigger, but that’s it.

Well, kiddies, I’m here to tell you that it’s possible to hop-up your radio, and you don’t need the soldering skills of Bob Novak to do it. With a few easy steps, you’ll be able to add an “instant steering” button—to get you off the boards in a hurry—and a power-on LED, so you don’t forget to turn off your transmitter. Finally, I’ve included a mod that helps you remount your antenna position.

I’ll show you how to modify Futaba* Magnum Sport and Magnum Junior radios, but with a little creativity, you’ll be able to apply these tricks to other brands. If you have a fancy, high-end radio, leave it alone. It has enough features, and trying to add more will lead to trouble. By the way, you’ll be violating your warranty as soon as you open the radio. Just thought you should know.

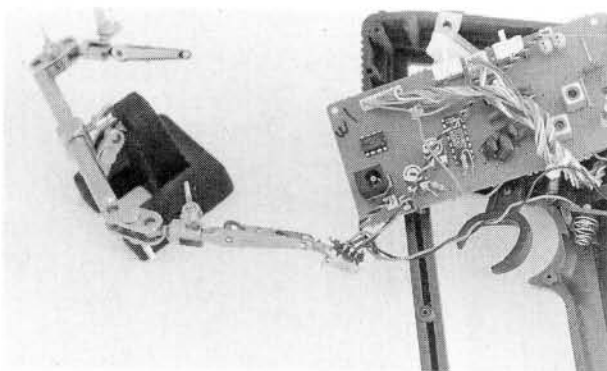
1 Open the transmitter

This seems like a no-brainer, but don’t forget to take out the smaller screws in the “spur” under the trigger and the bar that connects the front of the case with the pistol grip. Once the halves are apart, you’ll probably find that the main circuit board has fallen off its molded pins. If it hasn’t, take it off them now. Don’t worry; all the wires will stay connected. Oh, yes—remove the batteries before you open the case!



2 Remove the battery meter and switch

We won’t be working on the meter, but it must be removed to get at the switch. Just take out the two screws that hold it in place. Now we can get at the switch. First, use a

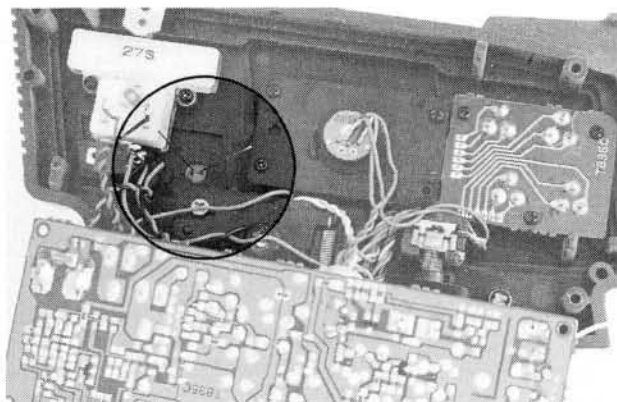


small screwdriver or a similar tool to push off the chrome button cover from within the radio. The switch may now be removed from its tray. There’s no hardware involved; just lift it up and out.

Radio Shack 12V red 5mm LED, part no. 276-209.
Radio Shack sub-mini SPST momentary switch, no. 275-1571.
40W pencil-type soldering iron.
3/16-inch drill bit.
Heat-shrink tubing or electrical tape.
Also helpful: digital voltmeter, "third hand" articulated clippy thing (I like Radio Shack no. 64-2063).

3 Install and wire the LED

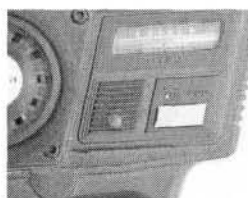
Take a look at the switch. You'll see three pairs of contacts, each with a red or black wire soldered on. Looking at it from the side of the switch with the button, the first two contacts are for the charge jack; to let juice into the battery, the circuit is open when the radio is off. The next two contacts connect the switch to the battery; when the battery pack is in the radio, these leads are always hot. If you wire the LED into these, it will never go off. The last two leads feed power to the radio only when the switch is depressed; these are the leads you'll wire the LED into. I find it easier to solder the LED after it has been installed in its case.



Drill a 3/16-inch hole where you want to install the LED (I like mine right by the meter). It should press in with a nice friction fit. If it won't go in with gentle pressure, enlarge the hole slightly with a tapered reamer or a hobby knife. If you overdo it and the LED is too loose, use a little Shoe-Goo or a similar material to hold it in place.

Now that you're ready to solder, note that one of the LED's leads is longer than the other; the longer lead goes to positive. If possible, use wire of the same gauge as the leads on the switch. I used wire from a 9V battery clip I had. Radio Shack 22-gauge stranded wire (part no. 278-1218) also works well.

For fine soldering work, use a pointed tip in a pencil-type iron of no more than 40 watts; stay away from big fat tips or super-hot gun-type irons; these will melt everything in sight. That said, simply solder positive to positive and negative to negative on those last two switch contacts. Be sure to insulate the LED's leads from one another and from the circuit board with some heat-shrink tubing or tape. To test your work, turn the radio on; the LED should glow. Turn the radio off, and be sure that the LED goes off, too. That's it! Just reassemble the case, and you've finished.



INSTANT STEERING BUTTON

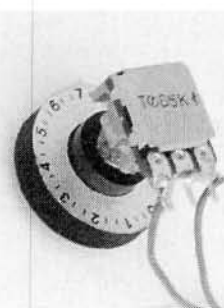
To run on an oval track (and even on certain off-road tracks and on-road courses), just about every driver who runs a transmitter with an adjustable steering rate will dial out almost all steering. That's great when you don't need a ton of servo throw, but it makes life tough when you need to snake around a crash or get off a board. Sure, you could dial your steering back in, but that takes time, and you'll never get your setting back without giving up your position. There are two solutions to this problem. Solution A: buy a new Hitec* Lynx radio, which features a steering-rate override (SRO) switch. Press the button, and you'll have full servo throw for full steering action. Release the button, and your steering goes right back to where you left it. Solution B: install your own override switch in your current radio! Here's how to do it:

1 Open the transmitter

It's the same as in as step one for the LED project.

2 Remove the steering-rate potentiometer

Yeah, yeah, it sounds so technical. Cool guys call it a "pot." (I'm not sure exactly how cool the use of electronic slang will make you.) Slide the little devil out of its molded tray, and coming out of it you'll see three prongs with wires attached to the outermost prongs. The idea here is to wire a switch between the two leads; when the switch is "on," the steering-rate pot is effectively removed from the circuit—simple.



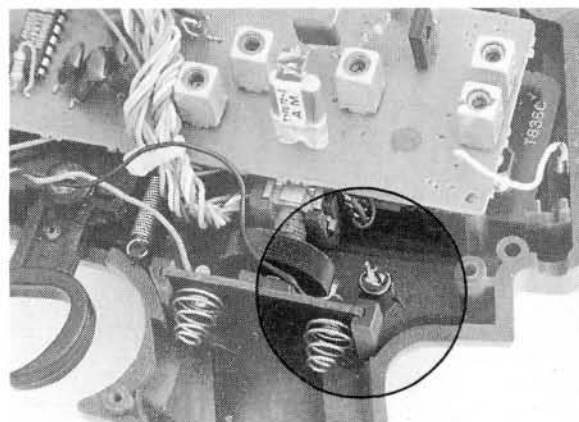
3 Install and wire the switch

Like the LED, wiring the switch is easier once it has been bolted into the radio. Just like the LED, the recommended Radio Shack switch will fit into a 3/16-inch hole. Drill the hole for the switch in a place that you can reach while you drive, but one that you can't bump accidentally.

Pass the switch through the hole, and fasten it with the included nut. Now you can solder it to the leads on the pot; there's no negative or positive to worry

about; just solder one wire from one prong to the switch, and another wire from the switch back to the other prong on the pot. To test your work, give your car a full steering input at the wheel, with all the steering dialed out at the pot. While you have the wheel cranked, hit the button. The car's front wheels should jump to full lock in whichever direction you're turning (obviously, do this with the car stationary). Release the button, and the servo will return the wheels to the amount of travel allowed by the steering rate pot. When it all checks out, reassemble your radio.

(Continued on next page)



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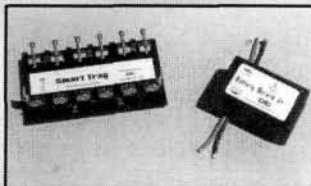
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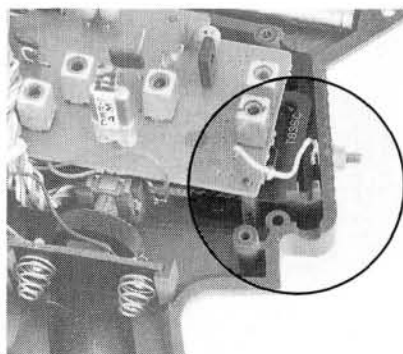
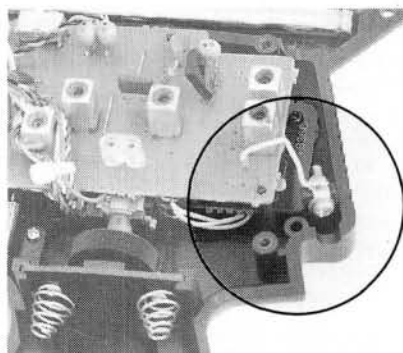
CELLBLASTER - \$199.95

HOW TO HOP-UP YOUR RADIO

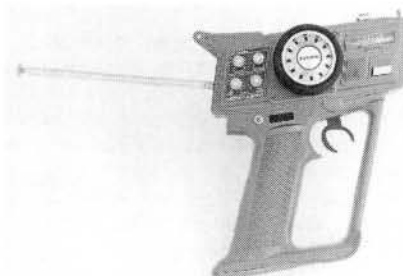
(Continued from previous page)

ANTENNA RELOCATION

This little mod might work for you. I favor a "lazy" transmitter position; I hold my radio at waist level and point the antenna down at the track. This isn't a big deal when I'm goofing around in a parking lot, but when I'm on the driver's stand, there's a real problem. As cars pass beneath my low-slung antenna, they glitch into the wall. Drivers equipped with FM or PCM radios aren't affected, but they are nonetheless distracted as they try to race while my antenna is doing a Zorro act over the front straight.



The solution is simple. If you'll open transmitter, you'll see that the antenna mount is simply a "nuttied" machine screw that is attached to a molded fork. All you need to do is unscrew it, drill a hole in the back of the radio, then reinstall the screw and nut in the hole. Voila! The antenna will point up as it should, and you'll avoid fisticuffs after the main.



*Addresses are listed alphabetically in the Index of Manufacturers on page 184.

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PICTURE A BEAUTIFUL roadcourse set high atop a hill in sunny California. The weather is perfect, and the pits are buzzing with activity. There's a friendly, but undeniably competitive feeling in the air. One hundred purebred racing machines—from vintage Mini Coopers to modern Formula 1 cars—await the drop of the starter's flag. Now, open your eyes; you're at the Tamiya Championship Series (TCS) U.S. Nationals!



by Frank Masi

TAMIYA

Championship Series *Nationals*

best of show awards

Each Tamiya event provides awards for not only the racing classes, but for top rookie in each class and "Best of Show." This year's nats kicked off Saturday morning with the Concours judging. It was quite thrilling to see over 100 scale R/C models lined up on the track's main straight—where else could you find a '95 Benetton F1 car sitting side by side with a VW Beetle?

As beautiful as these cars were, the rules state that to be eligible for "Best of Show," they must also race. You could see the pained look on the drivers' faces with each bump or tag from another car!

• Formula 1

Marty Hageman's "Kellogg's" Sauber C12 featured, in addition to its unique paintwork, a highly detailed, die-cast metal driver's helmet, cockpit and seatbelts, plus a set of wheeled jacks that Marty had fabricated just the night before from coat-hanger wire.



• FWD Touring Car

I didn't get a good shot of Hobie Kaptan's "Best of Show" FWD Toyota Tom's Levin. By the time I got to it, Hobie had sufficiently "weathered" it with a few tumbles on the track. Instead, here's a look at Hobie's awesome Ford Mondeo, which wasn't entered, but was spied lurking in the pits.



The ultimate parking lot race!

The pits were always hoppin'. Despite the big prizes up for grabs, the atmosphere was always friendly, and the racers were willing to help one another out.



PHOTOS BY FRANK MASI



Steve Nguyen's friends cheer him on during the final M-chassis round. It must have worked; Steve went on to win!



• M-chassis

The winner was Miguel Macias's Honda S800. Miguel improved upon this already highly detailed kit by adding a full interior and various external details, such as body-panel lines and a scale exhaust system.



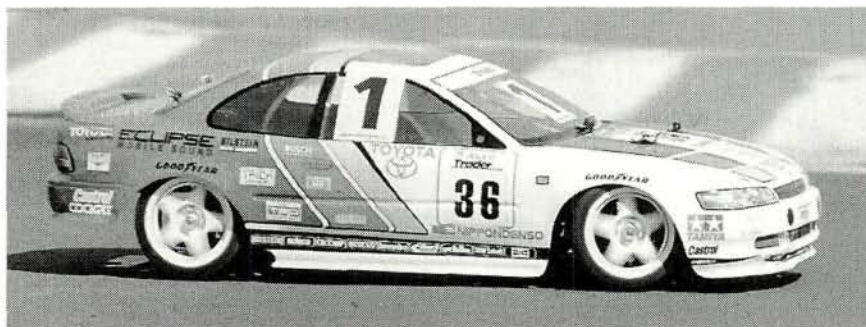
• 4WD Touring Car

Fernando Sales' awesome Opel Calibra DTM had the crowd in disbelief with its detailed interior. It featured both a driver and copilot figures, scale instrumentation and a fire extinguisher. For even more realism, Fernando also added scale brake disks.



TAMIYA NATIONALS

Winners from Tamiya's regional TCS events traveled to Tamiya America in Aliso Viejo, CA, to determine the national champion in each of the four TCS classes (M-chassis, FWD, 4WD and F1). In addition to becoming champions, the lucky winners will be flown—all expenses paid—to Japan to represent the U.S. at Tamiya's TCS World Championships. Last year's winners—Dave Berger (F1), Alex Guerrero (FWD) and Mickey Cohen (4WD)—did Old Glory proud in Japan, finishing third, fourth and tenth overall in their respective classes against some



Hobie Kaptan's "Best of Show" Toyota Tom's car hustles around the infield carousel turn.



A 4WD Alfa Romeo body on a FWD chassis. Many FWD racers prefer the handling provided by the larger 4WD sedan bodies.

very skillful Japanese drivers (who enjoyed an obvious home-track advantage) and European competition.

Although you must qualify at a regional event to compete in the nationals, not every eligible regional winner was able to

make the trip to the West Coast, so it was not surprising that the majority of the entrants hailed from California. There were, however, competitors from Florida, Maryland, Washington, Illinois, Kansas, and one person, (besides me!) had even journeyed from Connecticut. This shows that parking-lot racing isn't a California-only phenomenon anymore.

Of the field, there were 29 entries in both 4WD Touring Car and Formula 1 and 20 in FWD Touring Car. New this year was a class for the "mini," or M-chassis cars. You know, those cool-looking

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Last year's Formula 1 champ Dave Berger gives a tech seminar on the Tamiya F103 F1 chassis.

Mini Coopers, Fiats, Renaults and VW Beetles. Although there were only 13 entries, this class provided some of the most riveting action of the weekend.

The Tamiya track is probably the nicest permanent roadcourse in the U.S. Its glass-smooth asphalt surface is slightly granular, and it

TCS rules

The TCS Nationals are run a bit differently than your typical ROAR or NORRCA event. There are no qualifying heats or Mains; rather, contestants in each class race six rounds, two of which are "throw-outs." Finishing position is determined by adding together the best four rounds. The racer who turns the greatest number of laps in the least amount of time is declared the winner. After the completion of round 1, the racers are re-sorted according to their ability. This is also done after each subsequent round. This ensures fairness to all of the competitors, and because the racers are so evenly matched, provides the most exciting action for the spectators.

As with all TCS races, only Tamiya cars and hop-ups are legal. All classes except 4WD must use Mabuchi 540 motors with bullet-type connectors, and all battery packs must use Tamiya-type connectors. The 4WD touring cars can use motors of any wind, as long as they have fixed endbells (no adjustable timing) and have bushings (no bearings).

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Got your *passports*, guys?



4WD Touring Car
Scott Ernst, Milwaukee, WI



Formula 1
Garrett Yazell, Covina, CA



FWD Touring Car
Fred Medel, Sherman Oaks, CA



Mini (M-chassis)
Steve Nguyen, Garden Grove, CA

With an all-expense-paid trip to Japan at stake, the competition was intense. After two days of racing action and six rounds of fender-rubbing battles (well, the F1s don't have fenders, but you know what I mean), points were tallied and the winners were declared. That's the thing about this type of racing format: there's no main event, so you really aren't sure who won until after all the rounds are complete!

provides good traction for the racers. Should you get a little off course, the track's raised curbing is just enough to slow you down without causing damage. The course itself is challenging enough to make driving skill the most important factor, yet it isn't too difficult for novices to negotiate. And I'll tell you, the gray track surface combined with the green infield sections and red- and white-striped curbs provides the best photo backdrop I've ever seen through a camera lens!



The track at Tamiya America is a beautiful asphalt roadcourse (which can also be run as an oval) with raised curbing, covered pits and a huge, covered drivers' stand.

In addition to the regular racing program, there were several "fun" events as well as tech seminars for the racers. During Sunday's program, three rounds of "Media Madness" were held in which members of the media (R/C and full-size auto mags) competed using identically prepared Tamiya Indycars. Also, a "King of the Hill" race was held after the last round of "serious" racing had been completed. In this event, the winners of each of the four classes raced using—again—identically prepared Indycars. It was lots of fun! Tamiya's Dave Jun and last year's F1 champ Dave Berger (Dave 'n' Dave) gave tech seminars on Tamiya's TA03 touring cars and F1 cars, respectively.

CONCLUSION

The TCS has grown quite a bit since it started in '94, and it looks as if '97 will be even better. Event coordinator Eric Sands—who travels around the country to run *each* TCS regional event—did a great job and kept everything on schedule, and this was no easy task! As mentioned, Tamiya has added a new class for the M-chassis, and it looks as if they'll be adding a class for the 4WD desert trucks, e.g., Tamiya's Chevy S-10, this year. If you haven't yet been to a TCS event and you like parking-lot racing, check *R/C Car Action* for the TCS regional calendar for a race nearest you. You never know—you might be the one headed to Japan this year!



These touring cars are re

RS4 RALLY CARS

by John Howell

WHILE SITTING in our office one day, George Gonzalez and I were doing some of our infamous bench racing with our HPI* RS4s. We were both heavily looking over the car's design and I brought up the fact that when the car was introduced, I spoke with Kent Clausen at HPI, and he told me that sometime in the future, HPI may produce an off-road conversion kit for the car. Thinking back to that conversation set the wheels in motion. It was time for another project car.

RALLY RACING REVISITED

If you recall, back in our August '96 issue, we took three different 2WD off-road buggies and converted them into rally cars (see accompanying sidebars). They looked good and handled decently, but something was missing—scale looks. Although the cars served a purpose,

I still felt we could improve on our original rally idea. That's where the RS4 came in. While looking over the car in our office, George and I agreed that it would be the perfect candidate for conversion into a rally car. Its wheelbase could easily accommodate a Tamiya* rally body shell and keep a set of their equally scale-looking wheels and tires tucked underneath it. At this point, we didn't doubt that it would look good. The question was, could we get it to work?

QUICK AND EASY CONVERSION

We took our cars home and eagerly got to work. After I had gathered everything, I quickly found that the hardest part of the conversion was laying out and organizing all my tools! The only extra parts I needed were a new set of body mounts, a Tamiya body shell and a

set of Tamiya's rally wheels and tires. For the conversion, I chose one of Tamiya's newest bodies, the Repsol Ford Escort—pretty flashy-looking, isn't it? As for the process itself, I'll break it down into the steps that I took to complete the car.

1. I took off the touring car body and body mounts, unbolted the wheels and tires, and popped off the swaybars. (Phew!—man, was that tough.)

2. I bolted on the new wheels and tires and new body mounts and then test-fitted the Repsol body to the car (at this point, I was really starting to break a sweat).

3. I remounted the front and rear shocks lower on their shock towers to give the car some added ground clearance. I also had to flip the front Kose* shock tower around and put it on the front of the bulkhead to provide the necessary clearance for the shock to be mounted properly. I also had to grind a small slot in the top of the front bulkhead cap/shock tower holder "thingy" so the shock tower would fit low enough to match the mounting holes cor-

rectly (just look at the photo; you'll see what I mean).

Once the shocks were in place, I re-adjusted the front and rear camber and set it to -2 degrees both front and rear.



4. I popped the body onto the finished chassis and sat back to marvel over how cool the car had turned out.

5. Finally, I called the G-Man to tell him I was all done and that he'd better be "rally" prepared to get his butt kicked the next day.

So there you have it. In 30 minutes or less, my car was finished and ready to run.

PERFORMANCE

The moment of truth had arrived! I plopped the car down on the street in front of my house and slowly plunked around for my roommates, who had never seen an R/C car go. (A real R/C car that is, not one of those toy-store specials.) Once I had determined that everything had been trimmed properly, I boosted the speed from my mild 1mph test crawl up to "Han Solo silly-fast light speed." The car was absolutely ballistic, thanks to the Trinity* Dirtinator 14-turn double and 30A VIS cells; can you say, "land-based speed missile?!" It handles similarly to the touring-car version, but I had to watch it on the tight turns. The added ground clearance and the high-bite road surface and rally tires proved a little too much for the car to handle. All I had to do to successfully navigate through the turns on the asphalt was slow down. Duh ... that's easy enough.

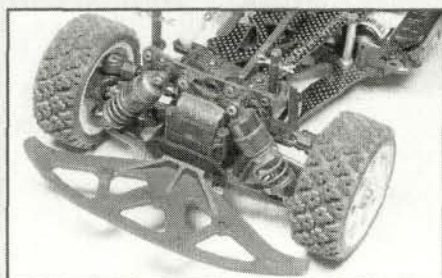
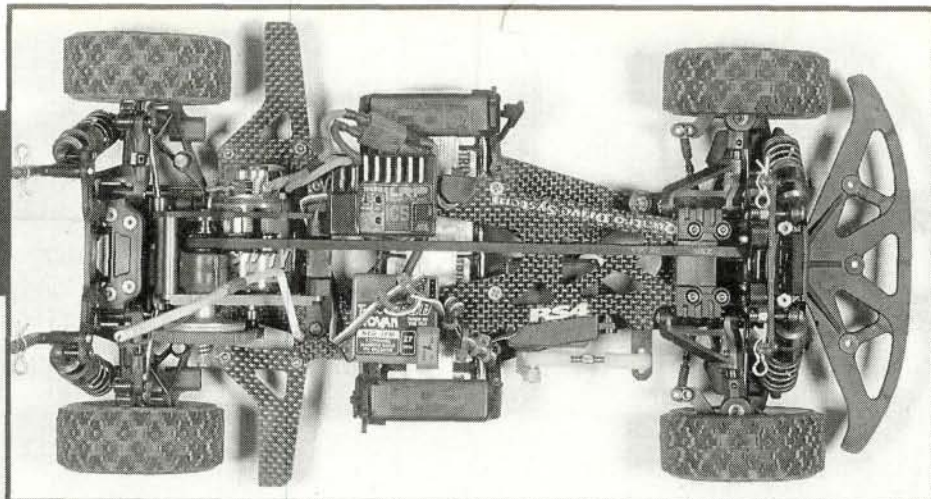
When I had finished showing off the car's wild maneuvers on the street, it was

ady to tear up the dirt!

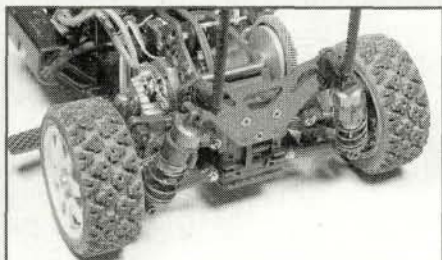


Doog's Rally Car

The backbone of my project was my wildly modified RS4. For those of you who didn't catch my "2nd Look" on this wild creation in its touring car form, I'll give you a brief rundown of the equipment I used and some of my setups.



I flipped the Kose front shock tower around so it was mounted on the front of the bulkhead cap/shock tower holder. To do this, I had to grind away a little material to make it fit better. The wide front bumper helps protect the front end (in case the ride gets a little wild).



In the rear, the car has ample suspension travel. The Tamiya rally block tires hooked up well on loose dirt and in sandy conditions.

Front End

- Shocks—standard RS4
- Shock piston—no. 1
- Oil—Trinity 20WT
- Springs—prototype medium
- No limiters
- Kose graphite front shock tower
- Lower shock-mounting location—outside hole on suspension arm
- Upper shock-mounting location—innermost hole on top of tower
- Toe-in/out—1 degree toe-out
- Camber—negative 2 degrees
- Caster—10 degrees (one spacer on each side of the kingpin)
- Front ride height—arms slightly above level

Rear End

- Shocks—standard RS4
- Shock piston—no. 1
- Oil—Trinity 20WT
- Springs—prototype firm
- No limiters
- HPI graphite rear shock tower
- Lower shock-mounting location—outside hole on suspension arm
- Upper shock-mounting location—middle of three vertical mounting holes
- Camber—negative 2 degrees
- Outer camber-link location—top hole on rear hub
- Rear ride height—arms slightly above level

Miscellaneous

- Body—Tamiya Repsol Ford Escort
- Tires—Tamiya Rally Block tires
- Wheels—Tamiya Repsol Ford Escort
- Motor—Trinity 14-turn double
- Battery—Trinity 30A VIS cells with Deans' connectors
- ESC—LRP ICS Digital
- Radio—Airtronics Caliber 3Ps
- Servo—Futaba S9402
- Receiver—Novak NER-3FM 27MHz
- HPI Graphite chassis, upper deck, and nerf wings
- HPI drive shafts front and rear
- HPI front bumper
- Trinity lightweight purple-anodized aluminum screws
- Battery location—all the way forward



I used an LRP ICS Digital speed control to help get the ponies to the ground. Rounding out the power package was a Trinity 14-turn double mod motor and a set of Trinity 30A VIS cells.

Buggy Racer

If you like rally cars but don't own an RS4 or another suitable touring-car chassis, don't fret; there are ways to convert just about any type of vehicle into a reasonable rally car. For example, we took three popular off-road buggies and converted them into spectacular rally racers that worked surprisingly well and were a blast to drive.



The major obstacle we had to overcome was limiting the up-travel on the front shocks so the tires wouldn't smack into the body while going over rough terrain. We then outfitted the buggies with Parma rally-car bodies (they offer several types), which, although not exactly scale, were wide enough to enclose the buggies' wheels.

Even though we had limited suspension travel a bit, our rally-buggies were still able to conquer some nasty tabletops and double jumps! And the good looks of the rally bodies turned driving an "old favorite" buggy into a new experience. If you're interested in learning more about converting a buggy into a rally car, pick up a copy of the August '96 issue of *R/C Car Action*—it's rally cool!

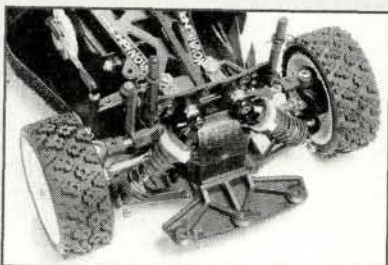


time to check out its off-road prowess. I punched it across the street to an open field and let loose some terror on the unsuspecting dirt. Holy rooster-tails! Man, that thing could sling some sand! The little sucker actually hooked up well. I was able to pitch it—under control—through the turns by feathering the throttle. The car handled small jumps and bumps just like the full-size version; the suspension worked admirably.

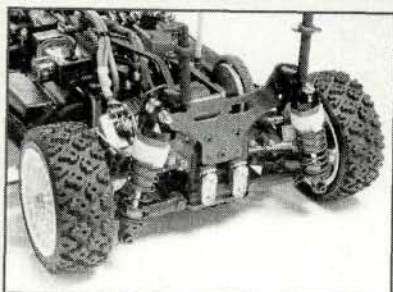
I can honestly say that not only does the car look absolutely incredible, but it also works extremely well. As a matter of fact, it's so cool-looking that when it's sitting on my workbench, I find myself saying, "Man, this thing is just the coolest," at least a dozen or so times before I leave to do something else.

G-Man's Lancia Delta Rally Rig

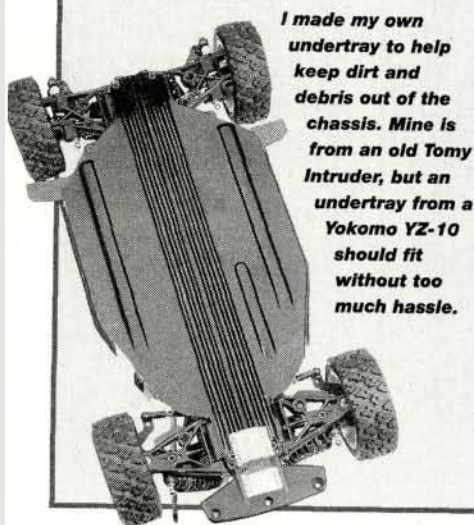
Check out the setup chart to see how I set up my RS4 to make it perform exceptionally well on just about every kind of track surface it has encountered.



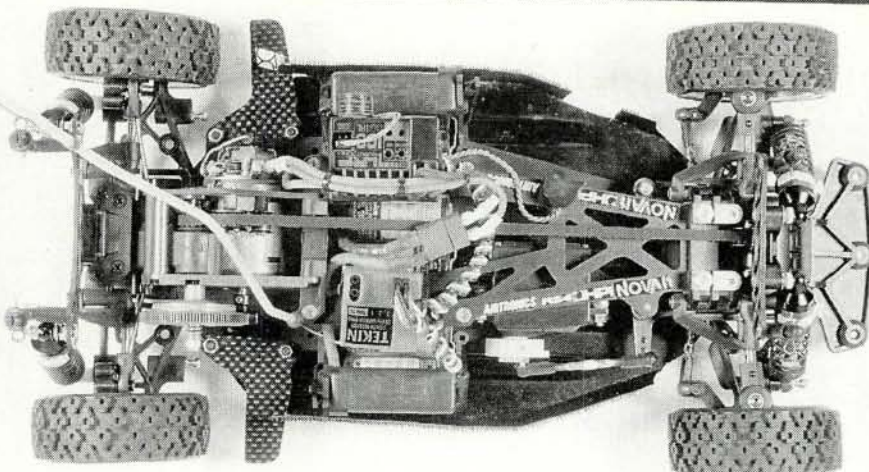
Notice the added Team Associated .56-stroke Team Shocks up front. I installed one RPM limiter on the shock shaft to limit up-travel.



Out back, I installed a set of .71-stroke Team Shocks—also with one RPM limiter to limit up-travel.



I made my own undertray to help keep dirt and debris out of the chassis. Mine is from an old Tomy Intruder, but an undertray from a Yokomo YZ-10 should fit without too much hassle.



Front End

- Shocks—Team Associated .56-stroke Team
- Shock piston—2 hole
- Oil—Trinity 20WT
- Springs—Associated Green
- Inside shock limiters—none
- Outside shock limiters—one RPM up-travel limiter (smallest size)
- Lower shock-mounting location—outside hole on suspension arm
- Upper shock mounting-location—upper hole on front bulkhead
- Pre-load—3mm on each shock
- Toe-in/out—1 degree toe-out
- Camber—negative 2.5 degrees
- Caster—15 degrees (both spacers all the way back on the hinge pins)
- Shims—2 Team Losi® Gold washers under steering block ball stud and one Gold washer under bellcrank ball stud
- Front ride height—1.5cm

Rear End

- Shocks—Team Associated .71-stroke Team
- Shock piston—2 hole
- Shock oil—Trinity 15WT
- Springs—Associated Green
- Inside travel limiters—none
- Outside shock limiters—one RPM up-travel limiter
- Lower shock-mounting location—outside hole on suspension arm
- Upper shock-mounting location—upper outside hole (Kose shock tower)
- Pre-load—5mm on each shock
- Camber—negative 3 degrees
- Outer camber-link location—lower outside hole on rear axle carrier (this position makes the camber link as long as it can be, and that provides a consistent tire contact patch with the track surface throughout the full range of suspension travel and during extreme chassis-roll conditions)
- Rear ride height—1.5cm

Miscellaneous

- Body—Tamiya Lancia Delta
- Tires—Tamiya Rally Block tires
- Wheels—Tamiya Lancia Delta
- Motor—Extreme Motorsports® 15-turn double
- Battery—Pro-Match 27A Sanyo 1700s with Deans connectors
- ESC—LRP ICS Digital
- Radio—Airtronics Caliber 3P
- Servo—Futaba 131 high-speed
- Receiver—Tekin® TFM 75MHz

George's Conversion

The HPI RS4 chassis lends itself quite well to a mild off-road application such as rally-car racing, mostly because of its sealed rear gearbox, included friction slipper clutch and extra-rugged construction. All that's really necessary to convert the RS4 into a first-class rally racer is to remove the travel limiters from all four shocks and install a Tamiya rally-car body and some tires. Sounds pretty easy, huh? Well, it is.

Of course, I decided to do a little more than just add more suspension travel and top the whole thing off with a rally-car body and some tires. Probably the biggest modification I made was to install different shocks. The stock RS4 shocks are excellent, but I wanted to add a little more suspension travel. Besides, the Kose rear shock tower I had installed during my RS4's touring-car days offers many more shock-mounting choices and allows the use of longer shocks. In the rear, I installed a set of Team Associated .71-stroke Team shocks, which not only increased suspension travel, but also improved damping significantly. Up front, I installed a set of Team Associated .56-stroke Team shocks.

The next most significant modification I made was the addition of a Lexan undertray (tub). The RS4's chassis plate is cut out, or "Swiss cheesed" to reduce weight. This is all fine and dandy for a touring-car application, but when racing off-road, the openings allow dirt to enter, and this ends up making a general mess of things. I searched through my junk box and found a Lexan undertray that was designed to fit the Tomy Intruder off-road buggy (yeah, I used to own one). With a little trimming, I had a Lexan tub that looks as if it was designed for the RS4.

I believe that with a little finagling, you could convert the Yokomo® YZ10 Lexan undertray to fit the RS4 as well. If you're interested, call GHI® for pricing and information on the Yokomo YZ10 Lexan undertray.

—George M. Gonzalez

(Continued on page 183)

Hitec Lynx Radio

High-performance features, low-ball price

by Peter Vieira

LATELY IT SEEMS as if every radio company is concentrating on releasing high-end models with more bells, whistles and gizmos to help us dial in our cars more easily. But what's available for the newcomer? Most beginners aren't interested in the top-of-the-line FM radio systems that will also cook their dinner after they've finished racing. Enter Hitec*—a company well-known for producing reliable entry-level radio systems at low prices. Their newest, the Lynx, is an AM radio system that has certain features that would make even some high-end radio systems drool.

FEATURES

Like others in its class, the Lynx offers the typical features that you really can't live without unless you're some kind of R/C masochist. Servo-reversing, servo trims and an LED battery meter all make life easier. Unlike others in its class, the Lynx also features adjustable steering rate and a unique steering rate override (SRO) switch.

The SRO switch is behind the "spur" of the pistol grip, and it's a handy feature for oval drivers or anyone else who needs to dial out steering. Simply hit the SRO button with your thumb (it's in just the right spot), and the steering servo has full throw to get you out of a mess, off a board, or around the corner marshal's ankle. Release the button

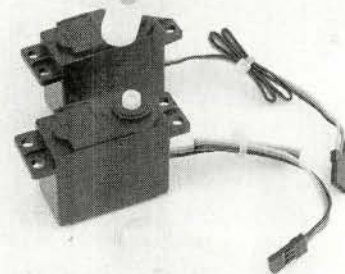
and your dialed-out setting returns, so you can get back to biz without swooping all around the track with full steering.

If you need to make rate adjustments on the fly, the dual-rate pot is just above the grip for easy while-you-drive operation. Little things I like: a built-in charging jack, a guarded on/off switch to avoid accidental turn-on in the pit (I've seen it) and a wide base so the radio stands steadily without falling over.

For the receiving end of the Lynx's AM waves, Hitec includes the HAS-2MB receiver with BEC, two HS303 standard servos, and a high-quality battery box and on/off switch—a nice touch for gas guys. The HS303 servos are a match in size and performance to Futaba's S148, so they're fine for most R/C duties short of 1/8-scale gas or full-on monster-truck action (as in 4WD/4WS). Some seriously beefy servo horns are included as well—a small, but appreciated touch. If your model requires that you use a kit-supplied



The Hitec Lynx includes everything you'll need, right down to a receiver battery box and switch.



Model muscle. A pair of HS303 servos can handle most linkage-yanking chores.

horn and there isn't a Hitec option, choose one with an Airtronics spline pattern. It will fit perfectly.

One feature I've come to take for granted with other transmitters is a mechanical adjustment for throttle-trigger throw. The Lynx does not have this; the trigger is fixed in a ratio of 70 percent forward/30 percent reverse. This is fine for use with an ESC, but drivers with wiper-type controls such as those found in Losi's sport kits may have trouble. Likewise, gas car throttle/brake setup may be compromised by this omission.

You should also be aware that the Lynx—although well-shaped—comes up on the short side in roominess. My pinkie finger was just about squeezed off the grip, and I don't have big mitts. Younger drivers shouldn't have any trouble thanks to their (surprise!) smallish hands. I recommend that you give the Lynx a test-squeeze before you buy.

(Continued on page 182)



Above: the teardrop-shaped switch overrides the steering dual-rate pot just beneath the wheel. Right: a dense-foam wheel grip is a nice touch. The servo-reversing switches are clearly labeled and protrude just enough to flick with a fingernail. The on/off switch is visible on the back of the housing.





Racers vie for position from the drivers' stand (above) and pit area (left).

Below: Gas-class winner Richard Saxton's Associated GT.



Right: Electric-class winner Mark Pavidis's Associated RC10T2.



PHOTOS BY BILL CARTER

NORRCA Truck World

IN THE SWELTERING Southern California heat, 150 of the finest gas and electric off-road racers gathered at the Ranch Pit Shop in Pomona to battle for the World Cup titles. Team Associated's Mark Pavidis—the current champion in both classes—was there to defend his titles. Team Losi/Team Trinity driver Brian Kinwald also hoped to take a title and achieve his 100th major race win. Would they be successful? We'd have to wait and see.



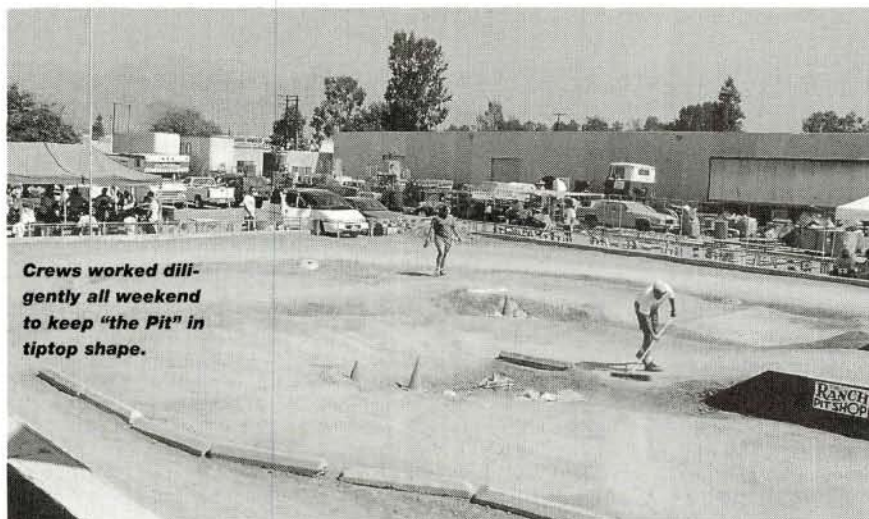
Mark Pavidis—Electric Truck winner—retained his title.

The Ranch crew laid out a challenging track design that included a tabletop jump, a triple-jump section and a long straight connected to a high-speed sweeper at both ends. During Friday's Electric Qualifying, the surface was a little dusty and traction was limited, but that night, the crew watered the track, and by mid-day on Saturday, it began to blue-groove and traction improved. Throughout the weekend, the crew did a fine job of maintaining the track.

QUALIFYING HIGHLIGHTS

- **Gas**—four rounds of 7-minute heats with a 2-minute warm-up before each heat. Team Associated's Richard Saxton—who had made several trips to the Ranch from his home in Las Vegas, NV, to practice for the event—performed well and took TQ. Team Losi/Team Trinity's Greg Hodapp took second, and Team Associated's Mark Francis was third. For Saxton, the practice had apparently paid off, but would it bring him an A-Main victory?

- **Electric**—four rounds of 4-minute heats. After his truck flipped, did a 360-



Crews worked diligently all weekend to keep "the Pit" in tiptop shape.

lead, and Kinwald had turned some great laps to move rapidly from eighth to fourth. After the first series of pit stops, Saxton held first and Kinwald had advanced to second, followed by Pavidis and Francis. At the 11-minute mark, Kinwald bobbled over the triples, and that took him back to third. Todd Cariseo was pulled off the track after a controversial rough-driving penalty. After completing just 12 laps, Hodapp, with what looked like a problem with his steering



The NORRCA Truck World Championships was held at the world-famous Ranch Pit Shop track in Pomona, CA.

Championships

by Stacey Granelli

Team Associated takes 2

degree turn in the air, landed and kept going without a hitch, Pavidis took TQ in round one. Kinwald took over as TQ in round two and then battled Hodapp for the top position in the next two rounds. Their times differed by a mere $\frac{2}{10}$ second (round three) and $\frac{1}{10}$ second (round four). Ultimately, Kinwald took TQ followed by Hodapp and then Saxton.

A-MAIN ACTION

- **Gas.** The Main lasted 45 minutes. To win, the racers would have to depend not only on their driving skills, but also on their pit strategies. A quick pit stop at the right time could be crucial to position and lap time.

After a 5-minute warm-up, the race was on. Hodapp had some problems with his clutch pins and missed the start, but his pit person worked quickly to get him back on the track. Richard Saxton took the lead from the start. He was followed closely by Mark Pavidis and Francis. At about the 5-minute mark, Hodapp reentered the race. Saxton was still in the

servo, was once again out of the race—this time for good.

The drivers came in to pit for the second time. Saxton was in and out without losing his position, and he was closely followed by Pavidis, Francis and Kinwald. Then Kinwald's truck flamed out. Back in pit lane, he restarted, but immediately encountered more trouble. Like his teammate, Hodapp, Kinwald had a problem with clutch pins that had shaken loose, and he was unable to continue the race.

According to NORRCA rules, drivers are allowed to treat their tires during pit stops, but they must not change them. The Main had to be run using just one set of tires. In the second half of the Main, drivers started to lose traction as their tires wore out.

Saxton still held a commanding lead over Pavidis and Francis. Francis flamed out and was restarted, but he dropped to fifth, losing his third place to Billy Easton. Pavidis and Easton continued to challenge Saxton for the rest of the race. Barry Baker, Francis and Jason Ruona tied



Greg Hodapp was in the hunt for the win, but mechanical problems and bad luck continually plagued him.

NORRCA TRUCK WORLDS

GAS

Fin.	Qual.	Driver	Chassis	Engine	Pipe	Fuel	Radio	Tires (F/R)
1	1	Richard Saxton	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
2	4	Mark Pavidis	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
3	5	Billy Easton	Associated	O.S.	Associated	O'Donnell	Futaba	Losi
4	3	Mark Francis	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
5	10	Jimmy Jacobson	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
6	7	Barry Baker	Losi	O'Donnell/O.S.	O'Donnell	O'Donnell	Airtronics	Losi
7	6	Jason Ruona	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
8	8	Brian Kinwald	Losi	O'Donnell	O'Donnell	O'Donnell	Airtronics	Losi
9	9	Todd Cariseo	Associated	O.S.	Associated	O'Donnell	Airtronics	Losi
10	2	Greg Hodapp	Losi	O'Donnell/O.S.	O'Donnell	O'Donnell	Airtronics	Losi

ELECTRIC

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Radio	Body	Tires(F/R)	Pinion/Spur
1	4	Mark Pavidis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi	NA
2	1	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi	19/88
3	5	Mark Francis	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Losi	NA
4	10	Sohrab Tavakoli	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi	19/87
5	6	Barry Baker	Losi	Maxtec	Orion/Reedy	Tekin	Airtronics	Losi	Losi	19/88
6	9	Gabe Boudreau	Associated	Reedy	Reedy/Orion	LRP	Airtronics	Associated	Losi	17/87
7	2	Greg Hodapp	Losi	Trinity	NA	Novak	Airtronics	Losi	Losi	18/88
8	3	Richard Saxton	Associated	Reedy	Reedy/Orion	Novak	Airtronics	Associated	Losi	18/87
9	7	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Losi	18/88
10	8	Greg Dennett	Losi	Peak Perf.	Orion	LRP	NA	Losi	Losi	18/88

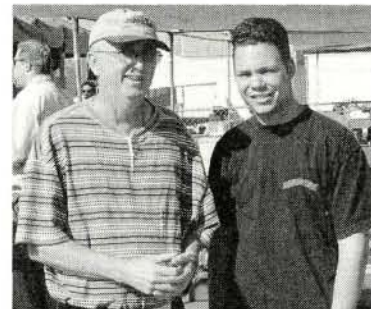
for position. When time expired on the main clock, all of Saxton's hard work had come to fruition. After a great performance on the track, he had taken the win, followed by Pavidis in second and Easton in third. Francis, Jacobson, Baker and Ruona rounded out the seven drivers left running at the end of the race.

• **Electrics**—a triple A-Main format of 4-minute Mains. With the top 10 qualifiers competing, a highly contested, exciting race was expected. But this race would be more noted for controversy than competition. All three Mains were marked by controversial contact that essentially led to the results being decided in the protest room rather than on the track.

In the A1 Main, Hodapp made contact

A New Speed Team

Mike Reedy recently recruited his son, Daren Westman, to the ranks of the Reedy/Associated pit crew. Mike is passing on all of his motor-tuning and battery-matching secrets to Daren, who will learn to do all the pit duties that Mike usually does—all to help the Associated drivers get as much as they can from their equipment. Mike assured me that Daren isn't being groomed to take his place at the pit tables, but rather to be an extra set of well-trained hands to lighten Mike's workload when he's covering the multitude of races he attends each season.



with Pavidis, but it wasn't until after the A2 Main that he was given a penalty.

Kinwald ran a clean race and was the leader at the end of the Main.

In the A2 Main, Saxton was given three warnings for coming into contact with race leader Brian Kinwald. Pavidis took the win, and Kinwald was knocked back to third. After this Main, Team Losi filed a formal protest asking that Saxton be kept out of the third Main. NORRCA officials reviewed video tapes and determined a penalty for Saxton: he would start in 10th position in the third Main.

The third Main got off to a rough start—a close battle between Kinwald, Pavidis and Saxton during which Saxton was accused of controversial contact with Hodapp. With 25 seconds left in the race, Kinwald crashed going over the triples. This allowed Pavidis to take over the lead and grab the overall win. Pavidis retained his Truck World Champion title in the electric class.

The folks at the Ranch Pit Shop should be commended for the outstanding job they did in hosting this event. Congratulations to Team Associated's Richard Saxton and Mark Pavidis and to all of the other racers for their triumphs.

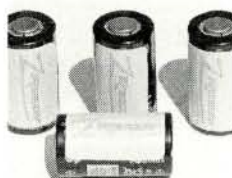
New in the Pits

Zig Batts

Mike Ziegler gave us a look at some of his new products.

- **Modified Motor Bearing R&R tool:** made of a softer Delrin material—\$12.95.
- **Bushing Bumper:** helps to push the bushing into your stock motor to give higher rpm—\$4.95.
- **Bearing Taper:** also made of Delrin; can hold an 1/8-inch bearing—\$7.95.
- **Lead Tape:** for wheel balancing—\$3.95.

• **Coil-Over Spring Matcher—\$19.95.**
For more details, call Mike Ziegler at (541) 389-6160.



Reedy Modifieds—Zappers

Reedy Modifieds and Team Orion have developed Voltage Maximizing technology and equipment that increase battery voltage without hurting its capacity or shortening its life. All Zapper cells are treated with this new system and are cycled and matched for voltage and capacity. They are available in 6-and/or 7-cell packs.



GETTING STARTED

by David Ditner

Covering the Basics

My first exposure to R/C came in 1982 when I was 13 and I saw my buddy's Tamiya Superchamp in action in front of his house. I was hooked right then and



there. I rounded up all my lawn-mowing money and bought my first car. It was a Team Associated RC12E Team Nats car—a kit replica of the car that Kent Clausen used to win the ROAR Nats in the early '80s. (See how long Kent has been kicking tail?) It came with all sorts of extra goodies and trick stuff—well, trick for back then, anyway! I think I

played with that car on average three to four hours a day—and it wasn't even summer vacation! The car has been to hell and back but still runs! Even though it's almost an antique, the car is quite nasty with its 7-cell battery and 13-turn motor.

Since that time, my "hobby" has exploded into an obsession and career! I now own more than 60 R/C cars, eight boats, two motorcycles and five helicopters! Yeah, you're right; I'm not married, but my girlfriend Serena is into R/C cars, too—go figure. She successfully built and ran a Team Associated RC10CE buggy and an 1/8-scale, gas-powered, 4WD Kyosho Inferno!

My first article in this killer magazine appeared in October '96 and was about my evil motorcycle with the spike-helmeted skeleton. Since then, I've done some kit reviews for *R/C Car Action*, and I own a hobby shop in Troy, MI. I regularly deal with newcomers to this awesome hobby. Many of the topics that I will cover come directly from novices' questions. I hope

that in writing this column, I'll make your entry to the hobby simpler and more enjoyable. Write to me *c/o R/C Car Action* if you'd like to have a certain topic covered.

The first topic I'll touch on is choosing your first R/C car. It's very important that you take this decision seriously. It can mean the difference between throwing your money away and beginning a lifelong, rewarding hobby. There's a huge variety of R/C cars and trucks on the market, from on-road to off-road, from dragsters to monster trucks. Put some thought into what you want. Understand that choosing a first car is very different from choosing a second car. By the time you are ready for the second one, you will have a pretty good understanding of where you want to go with R/C. Let's take a look at what it takes to get into the hobby the right way.

WHAT ARE YOUR R/C CAR NEEDS?

The first step in choosing a vehicle is determining your needs. This involves choosing the places where you will run it. If you intend to race, go to the local track and check

out the action there. You will need a competitive chassis. See what cars seem to do well there and talk to the racers about their setups. One caveat: talk to as many people as possible about vehicle preferences and the reasoning behind them. There is a rivalry in R/C racing between Associated and Losi just like there is in full-size racing between Ford and Chevy. Both Associated and Losi make excellent products; it really comes down to a matter of personal preference.

If you don't intend to race—at least right away—your criteria are quite different. If you have nothing but dirt roads and grass, an on-road car with less than 1/4 inch of ground clearance would be most inappropriate. In fact, my RC12E with new tires had about 1/8 inch of ground clearance! That didn't stop me from jumping up and off curbs, but I would have been better off (and had more fun) with an off-road car that had more ground clearance and full suspension. Remember, you can always outfit your off-road car with street tires.

OFF-ROAD OR ON-ROAD?

As a first car, I generally recommend an off-road vehicle. They're simply more versatile. Of course they run great in the dirt, but if you add a set of street tires, stiffen the shock springs and put thicker oil in the shocks, your off-roader will perform really well on the pavement. If you plan to road race, check the condition of the

pavement where you intend to run your R/C beast. Here in Michigan, it's pretty rough. You just about have to run an off-road vehicle on any park-

ing lot around here, unless it's freshly paved. You see, the competition-level on-road cars, e.g.,

12L, 10L, EV10, run best on fresh (baby's-butt-smooth) pavement or carpet and don't fare too well anywhere else.

A great all-around thrash vehicle class is stadium truck.

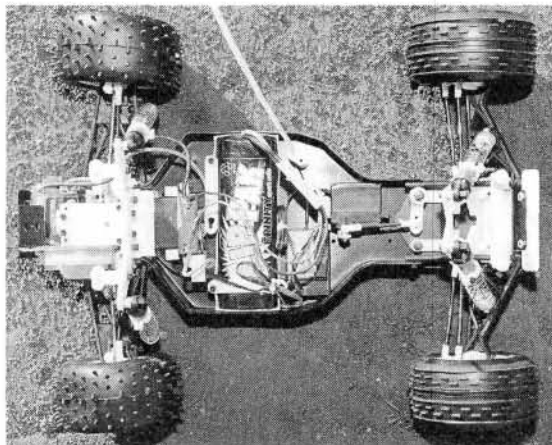


They have the same type of suspension as their race-buggy counterparts, but with wider suspension arms, longer shocks and larger tires. This spells rowdy! You get the same type of speed and more ground clearance to get you over and beyond the rough stuff.

SPORT VEHICLES AND ALL-OUT RACERS

On- and off-road vehicles come in two classes: sport and competition. For the most part, competition vehicles are made by Associated, Losi, Yokomo, Trinity, HPI, etc. Sport-level vehicles are made by Traxxas, Bolink, Parma, etc. Tamiya and Kyosho make both sport and competition vehicles. Some companies make sport versions of their racers, such as the Associated RC10T2 sport—a bushing version of Associated's world-class competition truck, the RC10T2.

The difference goes a little further because



A sport racing truck.

race kits typically come as rolling chassis. A rolling chassis does not include electronics or a motor. It also requires the use of an electronic

speed control, which is a solid-state throttle box that replaces the servo-operated mechanical speed control usually included in sport-type kits. The reasoning behind this is that racers want particular motors and speed controls, depending on the class of competition they choose. But, like anything else, all the good stuff costs money. You can score a ready-to-run (assembled, with radio) Traxxas Stampede for less than the cost of a racing-truck rolling chassis!



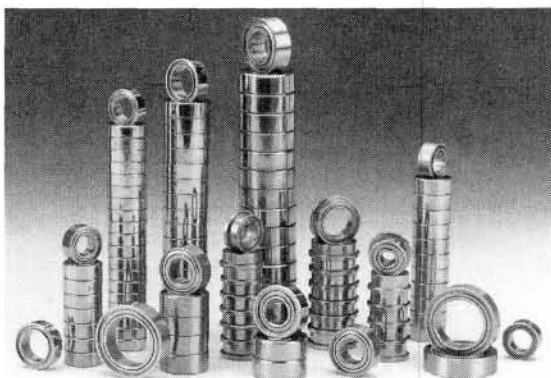
A full-race truck.

BALL BEARINGS

Obviously, cost is a major consideration when choosing your first car, but there are a couple of places where some extra bucks will go a long way. In sport or competition cars, nothing carries more "bang for the buck" than ball bearings. Bearings give you higher speeds, better acceleration and longer run times! They also give greater longevity to your drive train and suspension components. Compared with worn bushings, bearings will even make your tires last

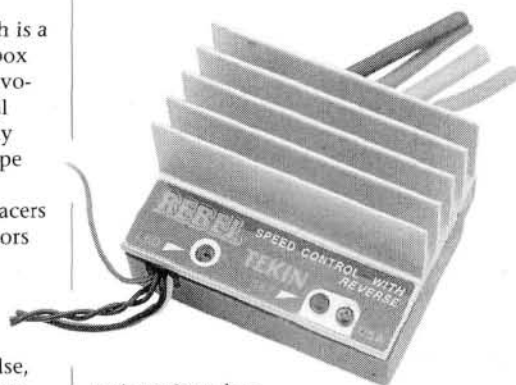
longer. Bet you can't name one single upgrade goody that gives this many benefits for about

\$40! Trust me, you can't. If your budget allows, get the bearing set; it's worth its weight in gold!



ELECTRONIC SPEED CONTROL

Another worthwhile option is the electronic speed control (ESCs). The mechanical speed controls included in most sport kits aren't as efficient, they can't handle hot modified motors, and they require cleaning and resistor replacement. ESCs are incredibly convenient; they make assembly and running cleaner, and they require little or no maintenance. These can be



quite pricey, but radio manufacturers such as Futaba and JR offer great entry level ESCs packaged with the control. For about \$100, you can get a cool pistol-grip radio system (no sticks; unfortunately, they're not available with ESCs) with an ESC! Entry-level ESCs have brakes and reverse, while their competition counterparts have forward and brake with no reverse. (In most sanctioned race events, reversing is illegal.)

Now that you've picked out your bad ride and radio, just add a battery and charger and you're ready to wreak havoc on the planet. Whether you decide to race or not, get out there and have a blast! ■

Mask Before You Paint

Comparing the Most Popular Techniques

by Rick Eyrich

HAVE YOU EVER known an R/C car fanatic who could easily build, set up and repair any scale or type of R/C vehicle but recoiled in fear at the mere mention of painting a Lexan body? For most of them, this terror arose when they first attempted it and the result was ... well, let's just say the finished product left a lot to be desired. Maybe the paint bled through into the clear window areas, or maybe some dark overspray clouded a light-colored spot, or perhaps the entire body ended up looking like an explosion in a paint factory!

Many of these disasters are the result of poor preparation, i.e., the body shell wasn't properly masked off prior to painting, or the painter failed to clean the surface properly. There are many techniques to avoid these painting glitches. They vary from painter to painter—depends on who you ask! So I focused on eight products (well, seven really, but one of them is

used twice!) commonly used for masking Lexan R/C body shells. I checked the performance of each one, so I'm able to tell you which may be best to protect your bodies from overspray, runs and bleed-through.

Eight masking methods—six using adhesive maskings and two using liquids—were chosen for this test article. All were easy to buy locally at the hobby shop and department store.



PREPARATIONS AND PROCEDURES

• For test pieces, I cut 0.040-inch-thick GE Lexan™ into eight, 1 3/4 x 3 1/2-inch strips. I then

Eight pieces of 0.040-thick GE Lexan were cut, numbered, cleaned and masked, then Coverite's Whizzer White R/C Lexan paint was applied and allowed to cure overnight before being checked.

cleaned each piece twice: first with denatured alcohol and then with soap and water. I then numbered each piece.

• Since I would be performing the actual test on the front sides of the Lexan pieces, I completely masked the backs of them. Doing this would provide a better view of the finished, painted trim-line on the front.

• I then used each masking technique; the six, self-adhesive types were pressed into place using a handy fingertip, and the two liquid-masking products were brushed on and allowed to dry overnight.

• Next, I sprayed the pieces with two light coats of Coverite's* Body Shop no. 101 Whizzer White R/C car Lexan paint followed by one heavy finishing coat.

The humidity was ultra-high, so I let the paint cure overnight just to be sure. Having dried, all the masking products remained stuck to the test pieces without any signs of bubbling anywhere.

Fluorescent and Metallic Paints

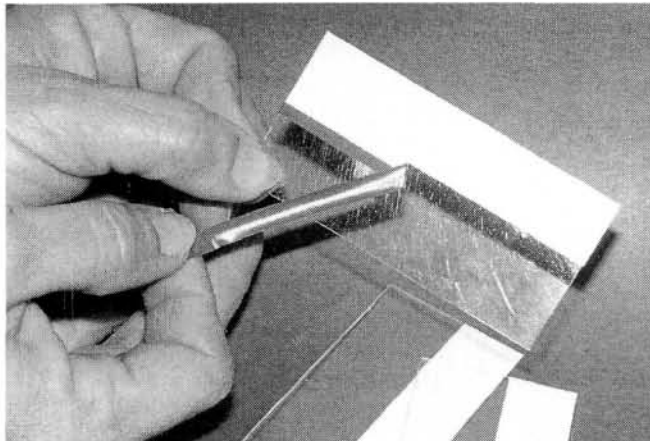
Many of you use fancy fluorescents and metallic paints on your body shells, so please read this much needed disclaimer. Fluorescent colors need more time to dry completely. They are opaque, so when they've dried, you must also apply a backing coat on top of them (white paint works best).

Metallics and candies also need extra time to dry and are more prone to run than other types of paint. These paints can actually melt some types of masking if applied in heavy coats! As a rule of thumb, it's better to apply several light coats instead of one heavy coat. This rule applies to every type of R/C paint.

THE RESULTS

Liquid Maskings

Parma* Liquid Mask. This has been around the R/C car and slot-car crowd for a long time. Many painters swear by it—and justly so, I might add. It did an excellent job during this test—a good sharp masking line without feathering or roughness. I removed the dried masking in one layer, and the slight haze left on the test



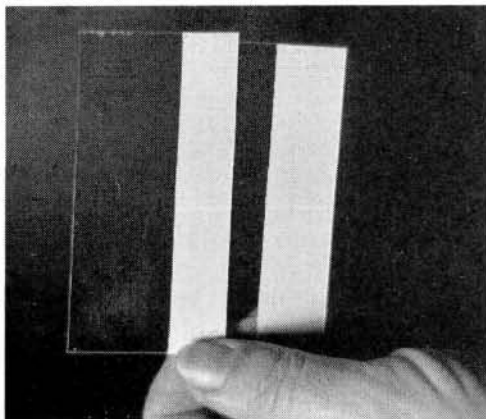
When the paint had dried, the masking was removed and the paint line was checked thoroughly. Paint seepage, straightness of line and ease of masking removal were all taken into consideration for the evaluation.

strip came off with alcohol. Many folks coat the inside of their body shell entirely with Liquid Mask and then simply "paint and peel" the colors as they go.

Great Planes* Master Mask. Like the Parma liquid, this can be sprayed on or brushed on, but it's slightly thicker than Liquid Mask, so it gave a heavier coating that was slightly more difficult to remove. The paint line was good—no bleed-through/paint seepage. My removal problem may be attributable to how I brushed it on. I bet that both of the liquid masks would work better if sprayed on with an airbrush.

Self-adhesive maskings

Dahm's* Pro-Mask Kit. This opaque frisket-type masking sheet comes with stencils to create a variety of effects. There was no bleed-through/paint seepage, and it held a good crisp line along the Lexan strip. When I removed the mask, a little adhesive remained. Dahm's Pro-Mask sheet did have one distinct advantage



Paper masking tape. I used regular, 2-inch-wide hardware-store tape. Many, many R/C car shells have been screwed up using regular paper masking tape. The paint not only crept under its edge, but it also

A close inspection of the finished edges revealed several things: some maskings work better on relatively flat body sections, while others will conform to almost any curved surface! Of course, your final choice will depend on your style of painting!

over the rest of the products tested: it's easy to cut it into any shapes or designs you want to lay out on the inside of your body shell. It also fits into curved surfaces nicely—good stuff!

Regular adhesive vinyl shelf covering. This "shelf paper" is available from most department stores in clear and colored styles. It did a fair masking job. When I removed it, some adhesive

remained, but alcohol took it off. This product doesn't lend itself well to compound curves or corners, so I'd limit its use to flat window areas and straight striping duties.

Great Planes EZ-Mask. This flexible-tape masking is great for the sharp bends and tight spaces found on some body shells. The EZ-Mask didn't allow any excess color to sneak under it; it kept a good sharp line. It comes in 1/8-inch and 1/4-inch widths and should work well on most R/C car paint schemes.

Regular automotive pinstripe tape. This wasn't designed to be a paint mask, but it might be OK for some minor body masking. It doesn't like sharp curves or mold lines, but on flat, straight areas, it can be used without major mishaps. The test piece showed no signs of bleed-through/paint seepage or tape lifting, and there wasn't any adhesive residue left when the tape was removed. So, for flat, smooth and straight paint lines, the auto tape works.

If it Doesn't say Lexan™ ...!

You might have noticed that I mentioned the use of GE Lexan. Many R/C paint jobs are messed up not because of the masking, but because of the material that the body is made of! Whenever possible, I try to purchase bodies that carry a clear marking that they're made of GE Lexan. The name "Lexan" is a GE trademark, and if you stick with it, you'll usually get better results.

The same goes for masking tapes. Whenever I can, I use 3M brands. Cheap tape often allows paint seepage, overspray and a thoroughly messed-up body! As the saying goes: "You get what you pay for." Let me tell you, folks; this surely applies when you're talking about Lexan and masking tapes!

raised the tape away from the Lexan. In addition, the tape's adhesive mixed slightly with the paint to form a nasty-looking residue. Of course, many folks use this wide masking tape to protect the outer shell, so it's obviously handy to keep around.

Paper masking tape (modified). Yup; this is the same product as the one used in the previous test, but I used it slightly differently. After applying 2-inch tape to the fresh Lexan test strip, I cut it in half with a hobby knife. This gave it a fresh, clean edge—a cleaner line than the uncut version. Many painters use this method to mask the window areas and the headlight cutouts on the grill. You'll need to be careful with the knife to avoid cutting too far into the Lexan; however, the technique works well in most cases.

FINAL TALLY

The overall results showed a close tie between the liquid masks, the EZ-Mask tape, and the Dahm's Pro-Mask. Fifth through eighth places went to the modified masking tape, the auto pinstriping, the shelf covering and the regular masking tape. You can find out which technique is best for you simply by doing what I did: test each one on some scrap Lexan! The last place you want to discover a bad masking job is on a brand-new Lexan, R/C car body!

*Addresses are listed alphabetically in the Index of Manufacturers on page 184.



From the track to the parking lot.
This is the R/C action as **you** see it.

Grassroots

Tamiya 4WD A-Main winners from left: Brad Palmer, Scott Orme and Brian Underwood.

This is YOUR PAGE! That's what "Grassroots" means—from the roots—the ground up; and that means YOU!—real, live R/C'ers—an entire page of your stuff! Show the world—yes, everywhere from here to there—what you and your R/C friends are doing. Wanna brag? Here's the spot. Go on; show us! Send photos with captions to "Grassroots Racing," *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606.

INTERNATIONAL ROOTS

TOURING CANADA

A Day at the Races Honda House Motor Speedway in Chatham, Ontario, hosted the first annual Canadian Indoor Touring Car Nationals. The event spanned a week-end and had winners in four classes: Tamiya FWD and 4WD and Super Touring Car FWD and 4WD. The two Tamiya classes were restricted to Tamiya chassis run on Trinity Street Spec batteries and bushing modified motors. The Super Touring Car classes were open to cars with any modified motor and 1700 SCRC batteries.

Qualifying Rounds—Saturday Only three cars were allowed to run during each heat, so every driver had enough space to make his best qualifying effort. The heats were re-sorted after each round so there could be no excuses for a bad drive.

A-Mains—Sunday With running order decided on Saturday, the door was open for competitive indoor racing. The Tamiya FWD and Super Touring Car 4WD classes saw fender-to-fender racing, and winners emerged in all four classes only after hard-fought battles.

Post-Race After the racing, everyone gathered for the awards ceremony and free draws. Honda House thanks Borgfeldt Canada Ltd., Competition R/C Imports and Horizon Hobbies for their generous contributions, which allowed almost everyone to walk away with—at the very least—a door prize! As well, Honda House would like to thank all the competitors for their participation and efforts in fairly contested and sportsmanlike racing.



Above top: Tamiya FWD A-Main winners (from left)—Mickey Cieslar, Ken Franklin and Raye Field. Above center: Super Touring Car A-Main winners (from left)—John Elliot, Wayne Vince and Chuck McKinley. Above bottom: Super Touring Car A-Main winners (from left)—Chris Stephens, Wayne Vince and John Elliot.

A-MAIN WINNERS

TAMIYA FWD		
Final Qual		Driver
1	2	Ken Franklin
2	5	Mickey Cieslar
3	3	Raye Field

TAMIYA 4WD		
1	3	Scott Orme
2	2	Brad Palmer
3	1	Brian Underwood

SUPER TOURING CAR FWD		
1	1	Wayne Vince
2	2	John Elliot
3	5	Chuck McKinley

SUPER TOURING CAR 4WD		
1	1	Wayne Vince
2	2	Chris Stephens
3	3	John Elliot



The track as several layout options: the longest circuit is about 200 meters long and the shortest, 120 meters. Track width varies between 5 and 2.5 meters. Corner marshals are positioned at several places along the course.

INDONESIAN INDY

Aria Hendrpati wrote to tell us about racing at the Karinda Off-Road R/C Car Model Circuit in Jakarta, Indonesia. Racers gather through the week to try out the red clay track. At the moment, they maintain a competition calendar only for 1/8-scale gas buggy races, but they have plans to increase their schedule.



This buggy flies into a wide corner as spectators watch the action from the pits.

Call now!

Whether you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here are a few hotline numbers to call if you have any questions, or if you'd like to start a program in your area.

Bolink Legend Series
(404) 963-0252

Tamiya R/C Championship Series
(800) TAMIYA-A

Kyosho R/C Sport Racing
(800) 682-8948 ext. 085F

Hobby Shack Parking Lot
(714) 964-8846

Hobby Town USA Parking Lot
(402) 434-5050

Trinity's Street Spec Series
(908) 862-1705

TEAM
DURATRAX[®]

RED ALERT

Nitro Racing Fuel



**Takes care
of your engine,
so your engine
can take care of
the competition.**

All fuels are not created equal. To make your on- or off-road car's engine run faster, better and longer, you need the unique formula of DuraTrax Red Alert.

Red Alert contains 20% nitro plus a carefully race-tested blend of castor and synthetic oils. The combination gives you optimum thermal stability; Red Alert continues lubricating and cooling your engine even while increasing its top-end performance!

Maybe that's why every driver in Kyosho's World Cup Series filled his tank with Red Alert. It's economical enough to use every day — and good enough to be the choice of champions.

For the location of the dealer nearest you, please call 1-800-682-8948. Mention code number 0814D.

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HOMEBUILT: FANTASY JET DRAG CAR

(Continued from page 87)

Damage was mostly limited to the body, so test runs continued that day without further incident, but the car was still fighting some electrical "gremlins" in the rocket-engine ignition system.

The following day (this time, with spectators!), Fantasy was again plagued by electrical problems. The first run was successful, but one of the top engines did not fire. On closer inspection, I discovered that yours truly had forgotten to connect the plug after reloading the engine! The second run was also clean, but both of the top engines failed to fire. I traced the problem to a faulty switch, which I promptly replaced. On the third and final pass of the day, it all came together as all the engines fired. I kept the car pointed straight and hit the rocket-ignition sequence right on time. Unfortunately, the car once again got sideways at the shutdown point (this time, it was moving really fast!), got crossed up again and rolled. All in all, it was a spectacular run, and the crowd loved it!

Though I had hoped to set a record at this event, it was not to be. The multitude of problems and a lack of speed-clocking equipment prevented me from getting an accurate time on the car. It was estimated that the final run produced a top speed somewhere between 75 and 100mph, but it was hard to tell. After reviewing the video, I have determined that the car loses downforce after the engine burn because of the sudden loss of thrust. I will (hopefully) correct this by adding an aluminum rear spoiler. I will also increase the thrust by adding a single 45-pound rocket engine supplied by Aerotech. It will replace the bottom 18-pound engine and will complement the top two 18-pound engines. This new combination will supply a total of 91 pounds of thrust! If I can keep the wheels on the ground, this should be more than sufficient to accomplish my two final goals. Further testing will commence this spring, followed by an official assault on a world record sometime during the summer. Stay tuned. I'll keep you posted on the results.

In the meantime, the people at Aerotech have assisted with the formation of the National Rocket Car Association. They are looking to plan some sort of national speed meet, and I am sure they would like to hear from any speed-crazed individuals like me who may be interested. Give them a call at (702) 393-8703 if you think you have what it takes to risk hard-earned dollars and time to make an R/C car go 100-plus mph! Or maybe you just need to be crazy! Either way, I think it would be a lot of fun. How about you?

*Addresses are listed alphabetically in the Index of Manufacturers on page 184.

ADVERTISEMENT

TEAM LOSI TECH TALK

IT'S HERE?

Well, be on the lookout for the XX-4—sometime soon! If you've never experienced the thrill of driving a 4WD off-road racer, when you get a chance, give the XX-4 a try. There's simply nothing quite like the thrill of speeding past other cars in the turns and out-accelerating cars and trucks when you leave the corners. For the latest on the new XX-4, be sure to check out Team Losi on the Web at www.teamlosi.com. You'll also find other info—products, tips, setup sheets and race results from around the world.

REDUCE INTERFERENCE

With electric-powered R/C vehicles, radio interference can sometimes cause racers to have difficulties; they scratch their heads, wondering what exactly is causing the problems. You're already aware of most of the common causes such as loose wire connections, no capacitors on the motor, a loose crystal, a severed antenna wire, someone else on the same frequency, etc. There's one other source that's almost always overlooked: the chassis. That's right; the chassis can actually cause radio interference. Though this is true for a standard Stiffezel chassis, the risk of interference being caused by the chassis is increased when a graphite one is used. Graphite is conductive, i.e., it can pass current. The interference is caused by current from the battery passing through the chassis in one way or another. A couple of simple precautionary measures can help you prevent this from happening. Most important, you should ensure that none of cells in any of your battery packs has torn or worn-out shrink-wrap. If an exposed side of a cell comes into contact with the chassis, the current will be passed through the chassis, and you'll probably experience radio interference. If one of your cells has an exposed side, wrap it with tape or clear shrink-wrap to insulate it from the chassis.

The rear part of the chassis under which the battery pack fits can also be an area of concern. If you use thick battery bars, they may touch the chassis, and this contact will again cause current to be passed through the chassis. To avoid this, simply stick a piece of tape inside both sides of the rear of the chassis. The tape will act as insulation and prevent current from passing through the chassis.

Let us know what's going on! Address your questions and problems to: Team Losi, "Tech Talk," 13848 Magnolia Ave., Dept. J, Chino, CA 91710.

WHAT'S new

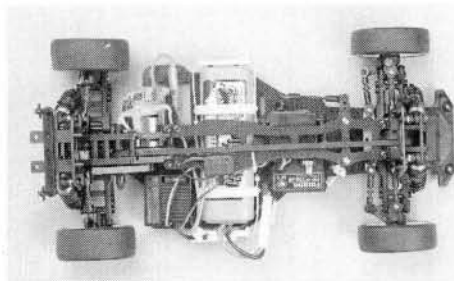
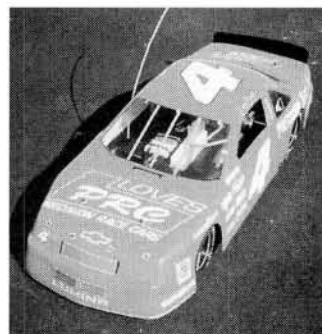
Love's PRC

1/6-scale "Spec 1" Car

This gas-powered Grand National Race Car is 32 inches long and weighs about 7 pounds. The 1/6-scale kit doesn't come with a motor or radio gear, but it does have everything else you need.

Part no.—2000; Price—\$300.

Love's Precision Race Cars, P.O. Box 251, Nuevo, CA 92567; (909) 928-1518.



Kyosho

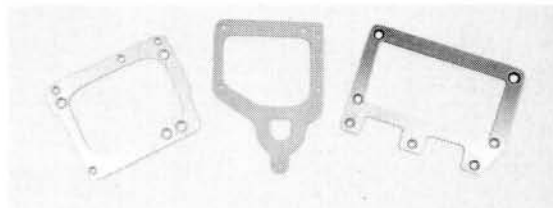
TF-2 4WD Type R Chassis

Narrower than ever before, this new light, sturdy 2mm-thick carbon chassis also offers more upgrades.

Features include: shock stays and upper plate; new suspension arms that meet all IFMAR specs; 22 ball bearings for smooth performance; Teflon™ touring shocks for improved damping; front one-way and rear ball diff for better response; rubber tires; and a smaller front bumper for better aerodynamics.

Part no.—KYOC0129; price—\$399.99.

Kyosho; distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



B-B Products

Titanium Pod Braces

These braces have been crafted from titanium so they don't break as easily as graphite or aluminum pod braces. Upper and lower braces are available to fit Associated RC10LSS, Trinity EV10SS, Bolink LTO/Sport 2000 and Wood X-13 cars and it comes in five colors: blue, gold, purple, green and variegated.

Part nos.—PB10A (Associated); PB101T (Trinity); PB102B (Bolink); PB103W (Wood); price—\$35.

B-B Products, 48835 N. 25th Ave., Phoenix, AZ 85027; (602) 465-7831; fax (602) 465-7077.

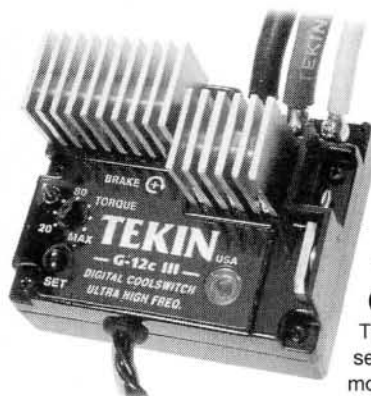
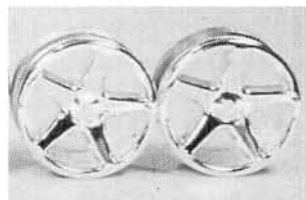
Schumacher Racing Products Limited

S.S.T. Scale Touring Wheels

These strong, rigid wheels are suitable for all scale touring cars with standard Tamiya fittings. Designed for racing enthusiasts, they are available in mirror chrome (shown here), satin chrome, dyable white and black.

Part nos. and prices—U1935 (full chrome), \$7.50; U1935C (satin chrome), \$7.50; U1932Y (white), \$5.50; U1933A (black), \$5.50.

Schumacher Racing Products Inc., 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593.



Tekin

TSCG12CIII Speed Control

This new speed control in the G-12 series offers GoldFET III transistors for more power (400 amps), and less resistance (.00075 ohm). Increased power and lower resistance allow faster acceleration and cooler running without heat sinks. It also includes a built-in Schottky diode, adjustable brakes for quicker trigger response and Tekin's unique Log-Anti-Log throttle response for more precise control.

Part no.—1121; price, \$199.99.

Tekin Electronics Inc., 940 Calle Negocio, Ste. 140, San Clemente, CA 92673-6201; (714) 498-9518; fax (714) 498-6339.

Serpent

Impact 2 Aluminum Middle Bracket

Replace your nylon bracket with this purple, machined-aluminum 4WD Impact 2 mid-axle bracket. It aligns the bearings more precisely for the front-wheel-drive belt pulley. By doing this, it increases the efficiency of the front-drive system.

Part no.—88521;

price—\$42.50

Serpent USA Inc.,
2832 NW 79th
Avenue, Miami, FL
33122; (305) 639-
9665; fax (305) 639-
9658.





Parma PSE Team Modified Motors

This new line of high-performance motors is based on Associated's Ultra-Sonic Teardown motor and feature diamond-true comms. They are available for on-road, off-road and oval racing cars.

Part nos.—90010 (on-road 11T double); 90013 (on-road 12T double); 90015 (on-road 15T triple); 90017 (on-road 16T triple); 90020 (off-road 10T quad); 90024 (off-road 11T quad); 90028 (off-road 12T double); 90031 (off-road 12T triple); 90035 (off-road 13T triple); 90039 (off-road 14T triple); 90040 (oval 12T quad); 90044 (oval 13T quad); 90048 (oval 14T quad); **price—\$80 each.**

Parma Intl. Inc., 13927 Progress Pky., North Royalton, OH 44123; (216) 237-8650; fax (216) 237-6333.

Associated

RC10B2 Sport

The B2 Sport has many of the features that made the B2 a championship winner—except for the price. It includes a molded-composite chassis and suspension, Stealth transmission, adjustable battery position and a neat bellcrank steering system with built-in servo-saver and adjustable Ackerman. To make the Sport more affordable, Associated replaced the hard-anodized shocks with gold-anodized ones, provided Oilite bronze bushings instead of bearings and exchanged the universal-joint drive shafts for separate dogbone/stub axle units.

Part no.—9011; price—\$250.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92625; (714) 850-9342; fax (714) 850-1744.



BK Products

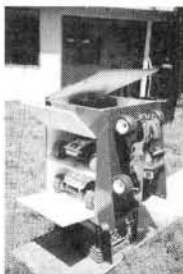
Hobby Tow 11

This latest model of this three-truck-capacity field pit station and transporter is designed to make your day at the races easier. Equipped with ample space in its two compartments for 1/10-scale racers as well as room for another 1/10- or 1/8-scale vehicle on two side hooks, it also features accessory and tool storage areas, rear ball bearing and rubber-tread wheels for quiet and easy movement, and

front rubber-swivel wheels for ease of transport on hard surfaces. For extra strength and fast assembly, the top and bottom compartments are constructed with 3/8-inch precut finish-grade plywood with mortised joints.

Price—\$144.95

BK Products, 3133 B Albatross Rd., Delray Beach, FL 33444; (561) 274-9026.



Trinity

Point Blank 1400 Power Pack

The Point Blank Power Pack offers all the power you'll need for backyard driving at a low, low price.

Part no.—P-536; price—\$24.99.

Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



Futaba

Magnum 3PDF Radio/Computer System

Designed to give racers an edge in competition, the Magnum 3PDF 3-channel FM computer radio system features 3-model memory, LCD and digital trims. Its functions include dual rates, ATV, ATL, expo and servo reverse. It also has a range of third-channel options including a starter motor and mixture control or gearbox. The system comes with an R113F 3-channel FM receiver and two S3003 servos.

Part no.—3PDF; price—\$349.95.

Futaba Corporation of America, P.O. Box 19767, CA 92723-9767; (714) 455-9888; fax (714) 455-9899.



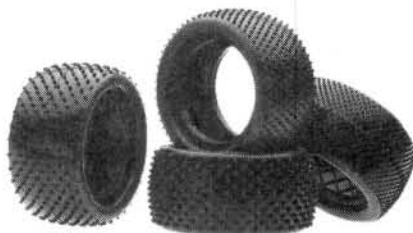
ProLine/Jaco

Race Ready M3 Compound

Designed to give racers an edge under the most demanding hard track conditions, this new M3 compound is "beyond sticky." It is softer, yet it gets better traction than any compound previously released by Pro-Line.

Part nos. and prices—8082M3 (Fuzzie, 2WD or 4WD rear), \$12.50; 8083M3 (Flat Fuzzie, 2WD or 4WD rear), \$12.50; 8086M3 (Flat Stubbie, 4WD front), \$12.50; 8087M3 (Step-pin, 2WD or 4WD rear), \$12.50; 8088M3 (Flat 80s, 2WD or 4WD rear), \$12.50; 8089M3 (Square Fuzzies, 2WD or 4WD rear), \$12.50; 8090M3 (Originals, 2.2-in. rear truck), \$17.95; 8092M3 (Fuzzie T, 2.2-in. rear truck), \$17.95; 8096M3 (Stubbie T, 2.2-in. race truck), \$17.95; 8097M3 (Step-pin, 2.2-in. rear truck), \$17.95; 8099M3 (Square Fuzzie T, 2.2-in. rear truck), \$17.95; 8125M3 (4WD Front Stubbie), \$11.50; 8135M3 (2.5-in. 4WD Front Fuzzie), \$11.50.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.



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HITEC LYNX RADIO

(Continued from page 118)

TESTING

I received the Lynx just in time to install it in a pre-hacked, uh, used Associated* RC12LW I had recently acquired. There isn't much space for mini-gear on a 1/12 chassis, let alone the "full-size" Hitec receiver and servo, but I got it all squeezed in along with a Tekin* ESC. Between the graphite chassis and the less-than-ideal wire routing made necessary by the cramped quarters, I had a recipe for glitching. Although it was fine on the bench, the real test would come on the drivers' stand.

Sure enough, there was glitching, but not with my car. As soon as I switched on the Lynx, my buddy's car went nuts. A crystal check confirmed that we were well apart in frequencies, and we were physically far apart on the drivers' stand. It turned out that his aftermarket receiver was the problem. I had also brought along an RC10LSO that had the same receiver, and it also glitched terribly. Other drivers who had factory receivers that matched their radios had no trouble, even when I stood right next to them. I consider it to be a fluke, but it might be a consideration if you plan to race. Once again, try before you buy.

Success in 1/12-scale racing demands precise steering control, and the Lynx has it. Of course, in my case, that means steering precisely into the boards, but that's my problem. I did my driving with all the steering throw dialed out, but found that I still had a little more throw than I needed. If you have this trouble, just move the steering linkage closer to the servo's output shaft.

The SRO switch is definitely a great feature, and it got plenty of use on New England R/C Headquarters' small carpet oval. After a pileup left my car pointing in the wrong direction (never my fault, of course), I was able to hit the SRO and cut a super-tight donut to get back in the race. When your corner marshals have the coordination and reaction time of a DUI suspect on "Cops," steering-rate override is a definite plus. The other controls on the Lynx were a pleasure to use as well. Everything fell readily to hand (or thumb, as the case may be).

FINAL ANALYSIS

If you have a wiper speed control, Magilla Gorilla hands and only race guys with aftermarket AM receivers on your band, the Lynx may not be for you. For the other 99.9 percent of you, the Lynx is a super buy. For the same price as some other units that lack a battery box, on/off switch, dual rate and no SRO button, the Lynx delivers all those features in a good-looking package. A full one-year warranty helps the confidence level, too. It's an excellent package and a real value.

*Addresses are listed alphabetically in the Index of Manufacturers on page 184.

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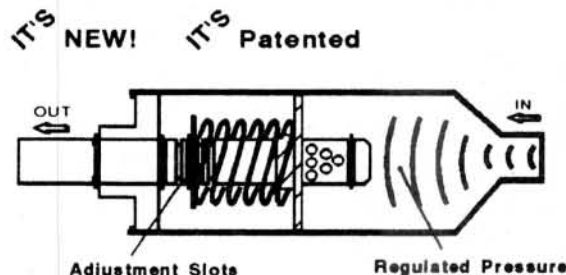


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RC DOCTOR

(Continued from page 49)

admit to trying many solvents in the past, including lacquer thinner (stinks and destroys Lexan), nail-polish remover (dulls shiny Lexan; the smell hangs around for hours; makes your friends think you do strange things in your spare time) and motor spray (leaves an oily residue; also eats Lexan; is very expensive; leaves your hands dry and sore). Nothing, in my opinion, beats humble lighter fluid (the kind made for flint-type lighters, not charcoal grills) as the racer's best friend when it comes to general solvent-based cleanup tasks.

When applied sparingly with a soft cotton shop rag, it will remove tire marks, wall rash and old decal glue from Lexan bodies without causing any damage at all. I frequently clean all my diff parts with this stuff, and it leaves them shiny and spotless and ready for battle—no matter what kind of top-secret experimental diff lube I've been using—and it doesn't have an offensive smell. I wouldn't spray it all over the place or use it any more than a dab at a time (hey, this stuff is flammable; that's why they call it lighter fluid!), but overall, I'd say it's pretty safe if you're reasonably careful.

I've been good, Frank! Can I come out of the lab, now?

*Addresses are listed alphabetically in the Index of Manufacturers on page 184. ■

RS4 RALLY CARS

(Continued from page 116)

The RS4's design lends itself well to mild off-roading. Now keep in mind, I wasn't trying to go for any doubles or triples with this thing. I haven't thoroughly abused it in any strenuous off-road conditions, but so far, it has held up to a decent amount of off-roading.

FINAL THOUGHTS

So am I satisfied with the car? Does Homer Simpson like donuts?

There are a few things though that I'd like to pass along, if you're interested enough to take on this project.

I was thinking of sealing the bottom of the chassis with a Lexan undertray like George used with his car (see accompanying sidebar on the G-Man's rig), or somehow trying to seal the chassis with some of Team Associated* Clear Chassis Protective sheets, but at the last minute, I decided against it. I haven't had any problems with dirt accumulating excessively on the inside of the chassis yet, but time will tell which option is better. I initially thought it would be best to leave a way for dirt to exit through the bottom of the chassis so it doesn't get stuck inside and bounce all over the place. As I said: we'll see. I'll pass along details on which is better.

If, for any reason, the car stops dead in its tracks, get off the gas immediately! I

know this sounds like a no-brainer, but it's better to be safe than sorry. I wouldn't want anyone out there to fry a motor or an ESC because there's something binding up the drive train. I haven't had any debris lock up the drive system's belt, but the pinion and spur are exposed to the elements and could get a little crunchy over time. You might also want to keep a close eye on the wear and tear on the pinion/spur.

The RS4's standard shocks work great for this application, but after seeing how cool George's Associated shocks looked on his ride, I have to admit that if I had a set lying around, I would have tossed them on, too. They're wicked smooth, so his suspension soaked up the bumps a little better.

All in all, I'd call my "Rally RS4" a complete success. George and I agree that it's one of the most fun cars we've messed with in a while, and we were both really geared up to do this project. Maybe rally racing will finally start to get big in the U.S.—at least in a slightly smaller scale!

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B

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T

OK, so this month, I get this email from a good kid named Jon who writes:

*Chris,
Here is what I have now:*

- HPI RS4
- XL2P radio
- Tekin G12 ESC
- Green Machine 2
- Sanyo batteries
- full bearing kit
- one-way pulley
- 2-speed tranny
- red springs in front, yellow in back w/30WT shock oil
- green swaybar in front and purple in back

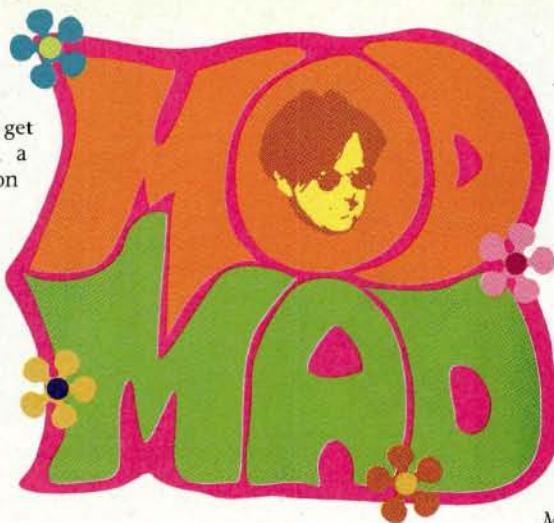
If I was to upgrade, what should I upgrade next?

Your driving skills, Jon. That's what you should upgrade next!

Those who know me could have guessed that this would be my first response. For all I know, Jon might be an excellent driver. Even if he is, the car he detailed above would do Joel "Magic" Johnson proud.

Look, I have nothing against upgrade modifications. Jon may have cash to burn. If he finds buying stuff for his car just plain fun, well, that's his business, right? I mean, I bought front and rear brush guards for my full-scale 4x4. Do I do any off-roading anymore? No. So why did I get them? Do I really need a reason? No.

So what's my point? OK, here it goes. There is a lot of cool modification upgrade editorial in this issue,



HELP!

**What do I need next?
Patience Grasshopper,
everything's cool.**

and I know that for many of us, much of the excitement this hobby has to offer is found in mods that make our cars faster and cooler. But once again, I feel the need to throw some perspective on this. You see, I'm still getting many emails and letters that go something like this:

Chris, I have a major dilemma. I don't know what to get—the new Quantum Theory Modified Motor octagonally wound with triple-braid (gold, platinum and beryllium) wire or the new Super-Conductor, quadruple-bypass, speed controller with dilithium shielding (Federation-approved). I'm on a limited budget, and I can't afford both. Please tell me which will make me more likely to win!!!

This is the stuff that makes me CRAZY!! I'm getting nervous here!!

Look ... I don't care if you shoot your damn car out of an atomic accelerator. If you haven't honed your braking and cornering skills to match this level of performance, you're still gonna lose!

OK, I'm calm now. I've already mentioned making mods that are commensurate with your wallet; now you have to learn to make upgrades that are commensurate with your driving skills. Here's the nice part: you'll often find that these two notions work very well together.

Isn't it strange how things just—I don't know—sort of work themselves out if we don't let our impatience get in the way?



A few views from the brilliance ever present on the Internet

LET THEM EAT SLAM

Chris, to all those people who still believe that you need \$900 in exotic hop-ups to win any races [like George and Doogie], listen to this. At the last parking lot race of the SJCC season, a magic thing happened. I became a major competitor. My RS4 had the stock kit tires, front and rear. Bushings all round. No hop-ups except for an arm brace set to keep the front end aligned. In every race, by the 3rd or 4th lap, I was in the lead. I had the slowest car there. But the other guys kept spinnin' out and slammin' into each other as I cruised around the track. Skill wins races, not money.

HpiGuy@aol.com

"MOD"-ERATION

Chris, I'm behind you 100%!!!

In the October issue, you had two things that I wanted to comment on: 1. The consistency not speed thing—I agree with you 100%! There is a local racer who could drive any car against us and still win. He has a perfect line every time. It's not the speed; it's the skills and consistency that count. Though, I must admit, at some point I have noticed that a car with no hop-ups starts to hold you back, so once you are a skilled racer, I think it may help a bit to hop up a car. 2. Also, you don't need expensive packs, just good gearing and setup. Last week, we ran a 6-minute Main, and I lasted about 1 or 2 minutes more after the Main was over with a 20-amp pack with around 350 seconds of run time. Well, that's my \$.02.

Phil Figgins
habajaba@dot-net.net

THE SECRET

Hey Chris!!!!!!

.....people are getting out of hand with mods, man. I have a friend who bought a XX-T, and before he even built the kit, he dumped two hundred bucks in hop-ups. Come on, people, money can't buy you a win! Practice is the only way to "buy" a win! I run an almost completely stock Associated RC10T race truck—yes, the first 10T kit available—and I can still blow the doors off of a fully trick XX-T CR because I spend two to three hours a week practicing. It's clear what the secret to winning is!

Jack "T-man" Dejnozka
nails@pipeline.com

This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. My internet address is: chrisc@airgame.com.